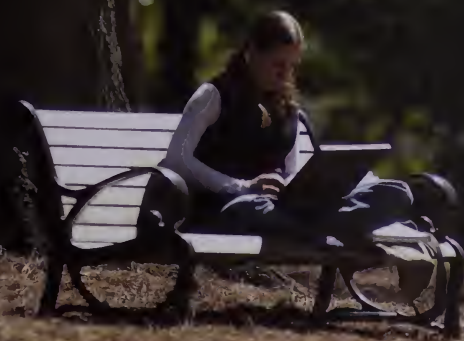


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2004/05

Graduate Announcements

4-2005



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UNDERGRADUATE ANNOUNCEMENTS

2004 - 2005



2003-2004 Record
One hundred eleventh year
Volume 79

ENGLISH FLUENCY

Clemson University has established a policy to assure that all instructional activities are conducted by individuals possessing appropriate proficiency in written and oral use of the English language. Instructional activities include lectures, recitation or discussion sessions, and laboratories. The individuals to be certified include full-time and part-time faculty, graduate teachers of record, graduate teaching assistants, and graduate laboratory assistants for whom English is not the first language.

A student who experiences difficulty with an instructor's written or oral English and who wishes to seek relief must do so prior to the seventh meeting of a 50-minute class and prior to the fifth meeting of a 90-minute class in regular semesters. In the five-week summer sessions, relief must be sought prior to the third class meeting.

The procedure is summarized as follows:

a. The student must quickly bring the problem to the attention of the instructor's department chair either directly or through a faculty member such as the student's advisor. That department chair will assess the complaint and, if deemed valid, offer an appropriate remedy within two days.

b. A student who is not satisfied with the department chair's decision or the relief suggested, may appeal within two days to a five-member hearing panel comprised of three faculty members and two students appointed by the Senior Vice Provost and Dean of Undergraduate Studies.

Students with questions should contact the Associate Dean of Undergraduate Academic Services, E-108 Martin Hall.

EQUAL OPPORTUNITY AFFIRMATIVE ACTION

Clemson University, in compliance with Titles VI and VII of the Civil Rights Act of 1964, as amended, Title IX of the Education Amendments of 1972, and Sections 503 and 504 of the Rehabilitation Act of 1973, does not discriminate on the basis of race, color, national origin, religion, sex, or disability in any of its policies, procedures, or practices; nor does the University, in compliance with the Age Discrimination in Employment Act of 1967, as amended, and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, discriminate against any employees or applicants for employment on the basis of their age or because they are disabled veterans or veterans of the Vietnam era. Clemson University conducts its programs and activities involving admission, access, treatment, employment, teaching, research, and public service in a nondiscriminatory manner as prescribed by Federal laws and regulations.

In conformance with University policy and pursuant to Executive Order 11246, as amended, Section 503 of the Rehabilitation Act of 1973, and Section 402 of the Vietnam Era Veterans Readjustment Act of 1974, Clemson University is an Affirmative Action/Equal Opportunity Employer.

Inquiries concerning the above may be addressed to the following:

Executive Secretary
Clemson University Board of Trustees
201 Sikes Hall
Clemson University
Clemson, SC 29634

Director, Office for Access and Equity
E-103 Martin Hall
Clemson University
Clemson, SC 29634

Director, Office for Civil Rights
Department of Education
Washington, DC 20201

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT

The Family Educational Rights and Privacy Act of 1974 (FERPA) affords eligible students certain rights with respect to their education records. They are as follows:

1. The right to inspect and review the student's education records (provided the student has not waived this right) within 45 days of the day the University receives a request for access.

Students should submit to the registrar, dean, head of the academic department, or other appropriate official, a written request identifying the record(s) they wish to inspect.

The University official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the University official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education records that the student believes are inaccurate or misleading.

Students may ask the University to amend a record that they believe is inaccurate or misleading. To challenge the accuracy of an education record, the student should write to the registrar or other University official responsible for the record and clearly identify the part of the record he/she wants changed and specify why it is inaccurate or misleading. If the University official decides not to amend the record as requested by the student, the University official will notify his/her vice president. The vice president will then notify the student of his/her right to a hearing regarding the request for an amendment. Additional information regarding the hearing procedures will be provided to the student when notified of his/her right to a hearing.

Note: The challenge of a student under this paragraph is limited to information which relates directly to the student and which the student asserts is inaccurate or misleading. With regard to a student's grade, this right does not permit the student to contest a grade on the grounds that a higher grade is deserved, but only to show that the grade has been inaccurately recorded.

3. The right to consent to the disclosure of personally-identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

One exception which permits disclosure without consent is disclosure to school officials with legitimate educational interest. A school official is a person employed by the University; a person or company with whom the University has contracted (such as an attorney, auditor, or collection agent); a person serving on the board of trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another University official in performing his or her tasks. A school official has a legitimate educational interest if the official needs to review an education record in order to fulfill his/her professional responsibilities.

Upon request, the University discloses education records without consent to officials of another school in which a student seeks or intends to enroll.

4. The right to refuse to permit the designation of any or all of the following categories of personally-identifiable information as directory information, which is not subject to the above restrictions on disclosure: student's full name, home address and telephone number, campus address and telephone number, campus e-mail address, state of residence, date and place of birth, marital status, academic class, class schedule and class roster, name of advisor, major field of study, including the college, division, department or pro-

gram in which the student is enrolled, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance and graduation, degrees and honors and awards received including selection to a dean's list or honorary organization and the grade-point average of students selected, and the most previous educational institution attended. Photographic, video, or electronic images of students taken and maintained by the University are also considered directory information.

Directory information may be disclosed by the University for any purpose, at its discretion. Any student wishing to exercise his/her right to refuse to permit the designation of any or all of the above categories as directory information must give written notification to the Registration Services Office (E-206 Martin Hall) by the last day to register for the enrollment period concerned as published in the Clemson University calendar.

5. The right to file a complaint with the U.S. Department of Education concerning alleged failures by Clemson University to comply with the requirements of FERPA. The name and address of the office that administers FERPA is Family Policy Compliance Office, U.S. Department of Education, 600 Independence Avenue SW, Washington, DC 20202-4605.

FAMILY PERSONAL PRIVACY ACT

The South Carolina Family Personal Privacy Act (SC Code 30-2-10 et. seq.) defines personal information as "...information that identifies or describes an individual including, but not limited to, an individual's photograph or digitized image, social security number, date of birth, driver's identification number, name, home address, home telephone number, medical or disability information, education level, financial status, bank account(s) number(s), account or identification number issued by and/or used by any federal or state governmental agency or private financial institution, employment history, height, weight, race, other physical details, signature, biometric identifiers, and any credit records or reports."

Some of the information in documents which students provide to Clemson University may be personal information as defined above. Pursuant to Section 30-2-40 B, students are advised that this information may be subject to public scrutiny or release. They are also advised that personally-identifiable information contained in these educational records falls under the federal Family Educational Rights and Privacy Act of 1974, as amended (FERPA). If students elect to opt out of the release of directory information under FERPA, the University will not release any personal information except as otherwise required or authorized by law.

PATENTS AND COPYRIGHTS

All students enrolling in Clemson University do so with full understanding that

1. The University has full ownership rights in any inventions, discoveries, developments and/or improvements, whether or not patentable (inventions), which are conceived, developed, or reduced to practice or caused to be conceived, developed, or reduced to practice by undergraduate students during the course of their academic activities conducted as part of any undergraduate curriculum. Any such invention will be handled by the University in the same manner as set forth in the *Faculty Manual of Clemson University*, the pertinent provision for which appears as Part VI E entitled "Patent Policy."

2. Copyright ownership of any research work will be determined by University policy and by policies of organizations responsible for publishing or distributing copyrighted material.

Copies of the policies on patents and copyrights are available in the individual departments and colleges and in the Special Projects Office.

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ACADEMIC CALENDAR

Maymester 2004

May 10, M	Late registration and first day of class
May 11, Tu	Last day to register; late enrollment fee applies
May 12, W	Last day to drop a class or withdraw from the University without a W grade
May 15, Sa	Classes meet
May 17, M	Last day for instructors to issue mid-term grades
May 18, Tu	Last day to drop a class or withdraw from the University without final grades
May 22, Sa	Classes meet
May 25, Tu	Examinations
May 28, F	9:00 A.M.—Deadline to submit all grades

First Summer Session 2004

May 17, M	Late registration
May 18, Tu	Classes begin; late enrollment fee applies
May 19, W	Last day to register or add a class
May 21, F	Last day to drop a class or withdraw from the University without a W grade
June 2, W	Last day for instructors to issue mid-term grades
June 3, Th	Last day to drop a class or withdraw from the University without final grades
June 7, M	Last day to order diploma for August graduation
June 22, Tu	Examinations
June 24, Th	9:00 A.M.—Deadline to submit all grades

Second Summer Session 2004

June 28, M	Orientation
June 29, Tu	Late registration
June 30, W	Classes begin; late enrollment fee applies
July 1, Th	Last day to register or add a class
July 5, M	Holiday
July 6, Tu	Last day to drop a class or withdraw from the University without a W grade
July 10, Sa	Classes meet
July 15, Th	Last day for instructors to issue mid-term grades
July 16, F	Last day to drop a class or withdraw from the University without final grades
August 4, W	Examinations
August 5, Th	2:00 P.M.—Deadline to submit candidate grades
August 6, F	9:00 A.M.—Deadline to submit other grades
August 6, F	Candidates for graduation may access grades
August 7, Sa	Graduation

Fall Semester 2004

August 15–16, Su–M	Orientation
August 16–17, M–Tu	Late registration
August 17, Tu	Convocation
August 18, W	Classes begin; late enrollment fee applies
August 24, Tu	Last day to register or add a class
August 31, Tu	Last day to drop a class or withdraw from the University without a W grade
September 7, Tu	Last day to order diploma for December graduation
October 6, W	Last day for instructors to issue mid-term grades
October 8, F	Last day to drop a class or withdraw from the University without final grades
November 1–2, M–Tu	Fall break
November 3, W	Registration for spring, Maymester, and summer terms begins
November 24–26, W–F	Thanksgiving holidays
December 2–3, Th–F	Classes meet; exams permitted in labs only
December 4–11, Sa–Sa	Examinations
December 13, M	9:00 A.M.—Deadline to submit candidate grades
December 15, W	9:00 A.M.—Deadline to submit other grades
December 15, W	Candidates for graduation may access grades
December 16, Th	Graduation

Spring Semester 2005

January 9–10, Su–M	Orientation
January 10–11, M–Tu	Late registration
January 12, W	Classes begin; late enrollment fee applies
January 17, M	Martin Luther King, Jr. holiday
January 19, W	Last day to register or add a class
January 26, W	Last day to drop a class or withdraw from the University without a W grade
February 2, W	Last day to order diploma for May commencement
March 2, W	Last day for instructors to issue mid-term grades
March 4, F	Last day to drop a class or withdraw from the University without final grades
March 21–25, M–F	Spring break
April 4, M	Registration for fall semester begins
April 9–16, Sa–Sa	Honors and Awards Week
April 28–29, Th–F	Classes meet; exams permitted in labs only
April 30–May 7, Sa–Sa	Examinations
May 10, Tu	9:00 A.M.—Deadline to submit candidate grades
May 11, W	9:00 A.M.—Deadline to submit other grades
May 12, Th	Candidates for graduation may access grades
May 13, F	Commencement
	9:30 A.M. (Colleges AF&LS, AA&H, E&S)
	2:30 P.M. (Colleges B&BS, HE&HD)

Maymester 2005

May 16, M	Late registration and first day of class
May 17, Tu	Last day to register; late enrollment fee applies
May 18, W	Last day to drop a class or withdraw from the University without a W grade
May 21, Sa	Classes meet
May 23, M	Last day for instructors to issue mid-term grades
May 24, Tu	Last day to drop a class or withdraw from the University without final grades
May 28, Sa	Classes meet
May 31, Tu	Examinations
June 3, F	9:00 A.M.—Deadline to submit all grades

First Summer Session 2005

May 23, M	Late registration
May 24, Tu	Classes begin; late enrollment fee applies
May 25, W	Last day to register or add a class
May 27, F	Last day to drop a class or withdraw from the University without a W grade
June 8, W	Last day for instructors to issue mid-term grades
June 9, Th	Last day to drop a class or withdraw from the University without final grades
June 13, M	Last day to order diploma for August graduation
June 28, Tu	Examinations
June 30, Th	9:00 A.M.—Deadline to submit all grades

Second Summer Session 2005

July 4, M	Holiday
July 5, Tu	Orientation
July 6, W	Late registration
July 7, Th	Classes begin; late enrollment fee applies
July 8, F	Last day to register or add a class
July 9, Sa	Classes meet
July 12, Tu	Last day to drop a class or withdraw from the University without a W grade
July 21, Th	Last day for instructors to issue mid-term grades
July 22, F	Last day to drop a class or withdraw from the University without final grades
August 10, W	Examinations
August 11, Th	2:00 P.M.—Deadline to submit candidate grades
August 12, F	9:00 A.M.—Deadline to submit other grades
August 12, F	Candidates for graduation may access grades
August 13, Sa	Graduation

Fall Semester 2005

August 21–22, Su–M	Orientation
August 22–23, M–Tu	Late registration
August 23, Tu	Convocation
August 24, W	Classes begin; late enrollment fee applies
August 30, Tu	Last day to register or add a class
September 6, Tu	Last day to drop a class or withdraw from the University without a W grade
September 13, Tu	Last day to order diploma for December graduation
October 12, W	Last day for instructors to issue mid-term grades
October 14, F	Last day to drop a class or withdraw from the University without final grades
October 17–18, M–Tu	Fall break
November 7, M	Registration for spring, Maymester, and summer terms begins
November 23–25, W–F	Thanksgiving holidays
December 8–9, Th–F	Classes meet; exams permitted in labs only
December 10–17, Sa–Sa	Examinations
December 19, M	9:00 A.M.—Deadline to submit candidate grades
December 21, W	9:00 A.M.—Deadline to submit other grades
December 21, W	Candidates for graduation may access grades
December 22, Th	Graduation

Spring Semester 2006

January 8–9, Su–M	Orientation
January 9–10, M–Tu	Late registration
January 11, W	Classes begin; late enrollment fee applies
January 16, M	Martin Luther King, Jr. holiday
January 18, W	Last day to register or add a class
January 25, W	Last day to drop a class or withdraw from the University without a W grade
February 1, W	Last day to order diploma for May commencement
March 1, W	Last day for instructors to issue mid-term grades
March 3, F	Last day to drop a class or withdraw from the University without final grades
March 20–24, M–F	Spring break
April 3, M	Registration for fall semester begins
April 8–15, Sa–Sa	Honors and Awards Week
April 27–28, Th–F	Classes meet; exams permitted in labs only
April 29–May 6, Sa–Sa	Examinations
May 9, Tu	9:00 A.M.—Deadline to submit candidate grades
May 10, W	9:00 A.M.—Deadline to submit other grades
May 11, Th	Candidates for graduation may access grades
May 12, F	Commencement
	9:30 A.M. (Colleges AF&LS, AA&H, E&S)
	2:30 P.M. (Colleges B&BS, HE&HD)

Note: Dates on this calendar were accurate at the time of printing. Dates, however, may change as conditions warrant. Current information is available on the Web at www.registrar.clemson.edu/html/fr7.html.

ADMINISTRATION

UNIVERSITY GOVERNANCE AND ADMINISTRATION

The University is governed by a board of 13 members, six selected by the state Legislature and seven self-perpetuating life members, in accord with the will of Thomas Green Clemson. The Board of Trustees is primarily responsible for adopting the long-range objectives of the University and the basic policies for achieving them; providing policy instruction for long-range planning; adopting the statutes of the University; electing the president of the University; employing the secretary of the board; maintaining ownership of University assets; and overseeing the evaluation of the University.

The president is the chief executive officer of the University, providing leadership to all phases of University planning; coordinating the operations of all units of the University; carrying out major University public relations functions; evaluating the results of University plans; and appointing personnel who report to the president. The day-to-day operations of the University are administered by the president and executive officers for advancement, public service and agriculture, and student affairs.

The Provost and Vice President for Academic Affairs is the chief academic officer of the University. The Provost is responsible directly to the president for all academic matters and has administrative jurisdiction over teaching and computing services. Vice provosts assist in administering and performing duties in coordinating graduate and undergraduate curricula; supervising computer information services, the libraries, scholarship and award programs; and other duties assigned by the provost.

Academic deans are the chief administrative officers of their individual colleges and report directly to the provost. They provide leadership in formulating and carrying out educational policy, review and make recommendations on personnel matters, and carry out and administer the academic and financial affairs of their colleges.

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GENERAL INFORMATION

Additional information can be found on the Web at www.clemson.edu.

PURPOSE OF CATALOG

The purpose of this catalog is to give a general description of Clemson University and to provide prospective students with detailed information regarding the various colleges and departments within the University and curricula offered by the University. Inasmuch as the educational process necessitates change, the information and educational requirements in this catalog represent a flexible program which may be altered where such alterations are thought to be in the mutual interest of the University and its students.

The provisions of this catalog do not constitute a contract which may be accepted by students through registration and enrollment in the University. The University reserves the right to change without notice any fee, provision, offering, or requirement in this catalog and to determine whether a student has satisfactorily met its requirements for admission or graduation. The University further reserves the right to require a student to withdraw from the University for cause at any time.

Each curriculum shall be governed by the requirements in effect on the date of enrollment. If a student withdraws from the University and subsequently returns or does not remain continuously enrolled (summers excluded), the requirements in effect at the time of return will normally prevail.

STUDENT RESPONSIBILITY

All colleges and departments establish certain academic requirements that must be met before a degree is granted. Advisors, department chairs, and deans are available to help the student understand and meet these requirements; but the student is responsible for fulfilling them. If, at the end of a student's course of study, the requirements for graduation have not been satisfied, the degree will not be granted. For this reason, it is important for students to acquaint themselves with all academic requirements throughout their college careers and to be responsible for completing all requirements within prescribed deadlines and time limits.

HISTORY

When one man of wisdom and foresight can look among the despair of troubled times and imagine what could be, great things can happen. That is what the University's founder, Thomas Green Clemson, was able to do in the post-Civil War days. He looked upon a South that lay in economic ruin, once remarking that "conditions are wretched in the extreme" and that "people are quitting the land." Still, among the ashes he saw hope. Mr. Clemson envisioned what could be possible if the South's youth were given an opportunity to receive instruction in scientific agriculture and the mechanical arts. He

once wrote, "The only hope we have for the advancement of agriculture (in the U.S.) is through the sciences, and yet there is not one single institution on this continent where a proper scientific education can be obtained." When he was president of the Pendleton Farmers Society in 1866, Mr. Clemson served on a committee whose purpose was to promote the idea of founding an institution for "educating the people in the sciences" and "which will in time secure permanent prosperity."

When he died on April 6, 1888, a series of events began that marked the start of a new era in higher education in the state of South Carolina, especially in the study of science, agriculture, and engineering. Mr. Clemson's passing set the stage for the founding of the university that bears his name—the beginning of a true "people's university," which opened the doors of higher education to all South Carolinians, rich and poor alike. In his will, Mr. Clemson bequeathed the Fort Hill plantation and a considerable sum from his personal assets for the establishment of an educational institution of the kind he envisioned. He left a cash endowment of approximately \$80,000 as well as the 814-acre Fort Hill estate to South Carolina for such a college. The biggest obstacle in the creation of an agricultural college—the initial expense—was removed by Mr. Clemson's bequest.

In November 1889, Governor Richardson signed the bill accepting Thomas Clemson's gift. Soon after a measure was introduced to establish the Clemson Agricultural College, with its trustees becoming custodians of Morrill Act and Hatch Act funds made available for agricultural education and research by federal legislative acts. The founding of Clemson Agricultural College supplanted the South Carolina College of Agriculture and Mechanics, which had opened in Columbia in 1880.

Thomas Green Clemson came to the foothills of South Carolina when he married Anna Maria Calhoun, daughter of South Carolina's famous statesman John C. Calhoun.

Born in Philadelphia, Mr. Clemson was educated at schools both in the United States and France, where he attended lectures at the Royal School of Mines, studied with prominent scientists in the private laboratories of the Sorbonne Royal College of France, and received his diploma as an assayer from the Royal Mint in Paris. Mr. Clemson, then in his mid-20s, returned to America greatly influenced by the European studies. He became a great advocate of the natural sciences, achieving a considerable reputation as a mining engineer and a theorist in agricultural chemistry. He also was a gifted writer whose articles were published in the leading scientific journals of his day, an artist and a diplomat who represented the U.S. government as chargé d'affaires to Belgium for almost seven years.

Mr. Clemson had a lifelong interest in farming and agricultural affairs. He served as the nation's first superintendent of agricultural affairs (predecessor to the present secretary of agriculture position) and actively promoted the establishment and endowment of the Maryland Agricultural College in the 1850s. Though remembered today for these accomplishments, Thomas Clemson made his greatest his-

torical contribution when, as a champion of formal scientific education, his life became intertwined with the destiny of educational and economic development in South Carolina. Although he never lived to see it, his dedicated efforts culminated in the founding of Clemson Agricultural College.

At the time of his death, Mr. Clemson was living at the Fort Hill homeplace, which today is a national historic landmark and provides a historic centerpiece for the Clemson University campus. He had inherited the house and plantation lands of his famous father-in-law, Senator Calhoun, upon the death of Mrs. Clemson in 1875.

Clemson College formally opened in July 1893, with an enrollment of 446. From the beginning, the college was an all-male military school. It remained this way until 1955, when the change was made to "civilian" status for students, and Clemson became a coeducational institution. In 1964, the college was renamed Clemson University as the state legislature formally recognized the school's expanded academic offerings and research pursuits.

On November 27, 1989, the University observed the 100th anniversary of the State's acceptance of the terms and conditions of Mr. Clemson's bequest.

The enrollment of Clemson has grown from 446 students at the opening of the University to 17,016 for the first semester 2003-2004. Since the opening of the University, 90,583 students have been awarded Bachelor's degrees. During this same period, 426 Associate degrees, 24,866 Master's, 315 Education Specialist, 2,399 Doctor of Philosophy, and 95 Doctor of Education degrees have been awarded, a total of 118,684 degrees.

Today, more than a century later, the University is much more than its founder ever could have imagined. With its diverse learning and research facilities, the University provides an educational opportunity not only for the people of the State, as Mr. Clemson dreamed, but for thousands of young men and women throughout the country and the world.

THE CAMPUS

The 1,400-acre University campus is sited on the former homestead of statesman John C. Calhoun. Nestled in the foothills of the Blue Ridge Mountains and adjacent to Lake Hartwell, the campus commands an excellent view of the mountains to the north and west, some of which attain an altitude of over 5,000 feet above mean sea level.

The Norfolk and Southern Railway and U.S. Highways 76 and 123 provide easy access to the City of Clemson and to the University. Oconee County Airport is four miles from the library. Both Atlanta and Charlotte are two hours driving time away.

Campus architecture is a pleasing blend of traditional and modern facilities enhanced by a beautiful landscape of towering trees, grassy expanses, and flowering plants. Academic, administrative, and student service buildings on campus represent an insured value of \$627 million. Clemson University's real estate holdings include over 32,000 acres of forestry and agricultural lands throughout the state, the majority of which are dedicated to Clemson's research and public-service missions.

Fort Hill, the former home of John C. Calhoun inhabited by Thomas Clemson, and the Hanover House are listed on the National Register of Historic Places and are open to the public. The campus also has two recognized Historic Districts.

The Strom Thurmond Institute houses the institute offices, Senator Thurmond's papers and memorabilia, and the special collections of the Cooper Library. The Institute is a part of an instructional and public-service district that includes the Brooks Center for the Performing Arts and the Madren Center for Continuing Education.

VISION STATEMENT

Clemson University will be one of the nation's top-20 public universities.

MISSION STATEMENT

The mission of Clemson University is to fulfill the covenant between its founder and the people of South Carolina to establish a "high seminary of learning" through its historical land-grant responsibilities of teaching, research, and extended public service.

Clemson University is a selective, public, land-grant university in a college-town setting along a dynamic southeastern corridor. The University is committed to world-class teaching, research, and public service in the context of general education, student development, and continuing education. Clemson's desire is to attract a capable, dedicated, and diverse student body of approximately 12,000 to 14,000 undergraduate and 4,000 to 5,000 graduate students, with priority to students from South Carolina.

Clemson offers a wide array of high quality baccalaureate programs built around a distinctive core curriculum. Graduate and continuing education offerings respond to the professions, while doctoral and research programs contribute to the economic future of the state, nation, and world. The University emphasizes agriculture, architecture, business, education, engineering, natural resources, science, and technology. The University also promotes excellence in education and scholarship in selected areas of the creative arts, health, human development, the humanities, and social sciences. In all areas, the goal is to develop students' communication and critical-thinking skills, ethical judgment, global awareness, and scientific and technological knowledge. Students remain the primary focus of the University.

Just as Clemson values its students, the University also values its faculty and staff who have committed their talents and careers to advance its mission. Clemson pledges to support their work, to encourage their professional development, to evaluate their professional performance, and to compensate them at nationally competitive levels.

ACCREDITATION

Clemson University is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award the Bachelor's, Master's, Education Specialist, and Doctor's degrees. Curricula are accredited by AACSB International (Association to Advance Collegiate Schools of Business), Accreditation Board for Engineering and Tech-

nology, American Council for Construction Education, American Dietetic Association, American Society of Landscape Architects, Computing Science Accreditation Board, National Architectural Accrediting Board, National Association of Schools of Art and Design, National Council for Accreditation of Teacher Education, National League for Nursing, NRPA/AALR Council on Accreditation, Planning Accreditation Board, and Society of American Foresters. Documentation of accreditation is available in the college deans' offices.

ADVISING POLICY

To ensure that students receive both personal and professional assistance in navigating through curricula and University requirements toward degree completion and graduation, the following policy was adopted by the Academic Council. Each student is assigned to an academic advisor (either professional advisor or faculty advisor) upon admission to the University. Responsibilities of the student and the advisor are clearly delineated in the advising process. The University maintains continual and systematic assessment of the process. The University Academic Advising Committee is responsible for implementing specific guidelines and evaluating effectiveness.

Goal I—The following University mission statement on academic advising shall be widely disseminated and implemented:

"Academic advising is an ongoing educational process that connects the student to the University. Academic advising supports the University's mission of preparing the student for learning beyond the confines of the academy. Academic advisors represent and interpret University policies and procedures to the student and help the student navigate the academic and organizational paths of the institution."

Goal II—The University shall demonstrate a continuing commitment to effective academic undergraduate and graduate advising through appropriate recognition, communication, policies, and funding.

Goal III—Each college and department shall develop a plan of action for continued commitment to effective academic advising consistent with the University's philosophy.

Goal IV—Academic advisors (faculty and professional staff) shall demonstrate effective academic advising consistent with the University, college, and departmental philosophies.

Goal V—Students shall be informed of their personal responsibilities in the advising process.

ACADEMIC SUPPORT CENTER

The Academic Support Center (ASC) provides comprehensive academic support programs and services that enhance students' learning potential, thereby promoting academic success and personal growth. The ASC provides a nurturing environment in which students are better able to learn how to learn as well as enhance their collegiate experiences. The Center serves as a catalyst to help achieve University goals by promoting high graduation rates, promoting excellence in advising, providing support

systems to all students, and increasing freshmen retention. The ASC offers the following programs and services to all students at no charge:

- Supplemental Instruction (SI) allows students enrolled in at-risk courses to work in a study group setting with peer leaders who have successfully completed the course and who have been trained to facilitate SI help sessions.
- Course specific tutoring is offered each week, Sunday through Thursday, in a group setting on a walk-in basis.
- Academic Skills Workshops are held throughout the academic year to enhance the learning experience and build academic skills.
- One-on-one academic counseling sessions help students evaluate their study skills and develop strategies for academic success.
- The ASC offers CU 101 (University Success Skills), a two-credit-hour course to assist freshmen and first-semester transfer students with developing academic and intellectual competence, exploring educational and career opportunities, establishing and maintaining interpersonal relationships, and becoming members of the Clemson Family.
- The Freshman Academic Success Program (FASP) is an early alert, early warning program for freshmen that supports good educational practices by providing students with prompt academic feedback and supplemental advising.
- The Early Success Program (ESP) is a year-long program to enhance the academic and personal success of special admission students.
- Student Disability Services coordinates the provision of reasonable accommodations for students with documented disabilities.

LIBRARIES

Clemson's main library, the Robert M. Cooper Library, is located at the center of campus and provides students with a variety of services and up-to-date collections. More than 1.6 million items are available including books, periodicals, microforms, government publications, and electronic materials.

Many library resources are available both on and off campus via the online catalog and the Libraries' Web site. The Libraries provide access to several thousand electronic journals as well as a number of electronic indexes, many of which link to full-text journal and newspaper articles.

Among the services the Libraries provide are circulation, reference, interlibrary loan, class instruction, and tours. Equipment available includes photocopiers, scanners, fax machines, and wireless laptops. Cooper Library houses two computer laboratories maintained by DCIT. There is also Java City Cyber Café and a popular reading and audiobooks collection in the library.

In addition to the Cooper Library, the University Libraries include the Emery A. Gunnin Architectural Library in Lee Hall and the Special Collections Unit located in the Strom Thurmond Institute. A small reading room containing periodical literature related to chemistry is located in the Hunter Chemistry Laboratory.

Detailed information regarding facilities, hours of operation, loan privileges, policies, and fines is available at the circulation and reference desks and on the Libraries' Web site at www.lib.clemson.edu.

COMPUTING FACILITIES

The Division of Computing and Information Technology (DCIT), on the Web at dcit.clemson.edu, supports the computing activities of students and employees with an extensive network of computers. DCIT maintains many computer labs throughout the campus, ten of which are public access. The labs contain high-end PCs and laser printing equipment. Students have access to the Internet, e-mail, and Microsoft Office XP Professional, which includes Word, Excel, and PowerPoint applications.

DCIT's Educational Technology Services (ETS) provides computer training and support to faculty, staff, and students in the use of MyCLE, the Clemson computer network, creating E-portfolios, and many desktop applications. MyCLE is the portal that provides managed class and work file space; Web tools, and services that facilitate the use of information technology in teaching and research. It is also a forum for collaboration among classroom and work place participants. These Web-based tools are provided both on and off campus. Information about MyCLE is available on the Web at ets.clemson.edu.

An extensive array of computer hardware is housed at the Information Technology Center (ITC) in the Clemson Research Park. DCIT operates a statewide computing network incorporating processors from a variety of vendors. The major general purpose computers are an IBM z800 running the OS/390 operating system and a SUN E3000 UNIX system. A host of Novell and Solaris servers provide computing resources for client-server computing. Approximately 3,500 PCs and work stations are connected to the campus FDDI/Ethernet network.

Computer training is available through the ETS to all students and employees as part of regular University courses, through short courses, through special training programs, and through E-learning courses. A complete list of services is available on the Web at ets.clemson.edu. For face-to-face assistance, the Help Desk is open seven days a week and is centrally located in Martin Hall M section. Students may also call 656-3494, send e-mail to consult@clemson.edu, or check on the Web at helpdesk.clemson.edu.

The campus computer network can be accessed through wired network connections found in all on-campus dorm rooms and apartments or through the University's extensive wireless network. This wireless access network provides 802.11b coverage to most areas of Clemson's campus. Students wishing to connect to the wireless network are encouraged to buy the recommended Cisco AIR-PCM352 adapter. Details can be found on the Web at wireless.clemson.edu.

Laptop Program

The following students are required to have laptop computers:

- College of Architecture, Arts, and Humanities—freshmen and sophomores;

- College of Agriculture, Forestry, and Life Sciences—freshmen and sophomores;
- College of Business and Behavioral Science—freshmen, sophomores, juniors, and all on-campus MBA students;
- College of Engineering and Science—all undergraduates;
- College of Health, Education, and Human Development—freshmen.

While students may bring any laptop that meets the minimum specifications, there is a recommended laptop posted at laptop.clemson.edu. Students using the recommended laptop will receive both software and hardware support. Students electing to purchase and bring their own laptops will be responsible for their support. See laptop.clemson.edu for more information or e-mail LAPTOP-L@clemson.edu.

CALHOUN HONORS COLLEGE

Established in 1962, Calhoun Honors College strives to enrich the educational experience of highly motivated, academically talented students by providing opportunities for scholarship and research not always available to undergraduates.

Entering freshmen are invited to join Calhoun Honors College based on information taken from the Application for Admission to Clemson University. Such information includes high school rank and grade-point average, SAT and/or ACT scores, and other indicators of scholastic potential. No one factor alone is sufficient to warrant an invitation. In considering candidates for admission, the Honors Office extends invitations to those students who show promise of meeting the high academic standards of the Honors College. Admission is highly selective and is based, in part, on the quality of the applicant pool and the availability of space for freshmen in the Honors College.

Enrolled students may join the program if they have a cumulative grade-point ratio of 3.40 or higher as full-time students at Clemson and have at least four semesters remaining to graduate. To continue membership, students must maintain a cumulative grade-point ratio of 3.40 or higher and must complete at least one honors course each semester.

The honors curriculum consists of two distinct programs of study. To earn General Honors, students must complete at least six honors courses of no less than three credits each. Most of the courses taken for General Honors also satisfy Clemson's General Education requirements. Departmental Honors provides opportunities for in-depth study and research within the student's major. To receive honors credit, whether for General Honors or Departmental Honors, each honors course must be completed with a grade of A or B. Detailed information can be found in the Honors Student Handbook.

Students completing both General Honors and Departmental Honors are recognized at an awards ceremony on the eve of commencement, at which time they are presented the B. C. Inabner Honors Medallion. This medallion, as well as the student's diploma, transcript, and commencement program, recognizes Honors graduates as Calhoun Honors College scholars.

In addition to the intellectual challenge of Honors, advantages of membership include priority course scheduling, honors housing (on a space-available basis), extended library loan privileges, and special lectures and cultural events.

Calhoun Honors College is institutionally responsible for administering the Dixon Fellows Program which helps students prepare to compete for Rhodes, Marshall, Truman, Fulbright, and other prestigious extramural fellowships.

COOPERATIVE EDUCATION

The Cooperative Education Program is a planned program in which students combine alternate periods of academic study and periods of related work with a participating business, industry, agency, or organization. Work periods normally take place during the sophomore and junior years (including summers), while the freshman and senior years are spent in full-time study.

Students may qualify to participate in the Cooperative Education Program by satisfactorily completing 30 credit hours of academic work. Transfer students may qualify in one semester. Three, four, or five co-op work periods are projected and included in each student referral. Usually two students from the same academic area are paired to fill a full-time position.

Students enrolled in the Cooperative Education Program pay a nominal registration fee each semester or summer session which coincides with their work period. That fee enables students to maintain student status and participate in student activities and services that are normally associated with enrollment at the University; however, the fee does not cover the cost of tuition for academic courses, health service, or any of the other benefits normally associated with the standard University fee. In responding to insurance, tax, loans, and other questionnaires about status, the University classifies a student on work assignment as a full-time continuing student. The work assignment is considered an integral part of the student's education, but no academic credit is awarded for this experience.

STUDY AND WORK ABROAD PROGRAMS

Through the Study Abroad Office, students may choose from a variety of programs offered overseas. Programs are varied to fulfill the needs of most students, such as the exchange programs at the University of Aberdeen in Scotland, Universidad Catolica de Santiago in Chile, University of Newcastle in Australia, and University Rovira i Virgili in Spain. There are programs for every academic major at Clemson University. Programs abroad are offered in Australia, Belgium, Chile, China, Czech Republic, Ecuador, England, France, Germany, Japan, Mexico, Portugal, Russia, Scotland, Spain, and more. Both Clemson Programs Abroad and the International Student Exchange Program (ISEP) allow students to enroll and pay fees directly to Clemson while they study abroad. With the ISEP program, students study for a semester or an academic year at one of more than 80 institutions world-wide. Transfer credit usually applies within the major with prior academic

department approval. Financial aid and scholarships may also transfer for many of the programs abroad.

Internships and work abroad programs are also available. Applications are usually due in October for spring programs, in February for fall and academic year programs, and in April for summer programs. Interested students are encouraged to contact the Study Abroad Office staff, E-306 Martin Hall, at the beginning of each semester and throughout the academic year to explore their opportunities abroad.

RESERVE OFFICERS TRAINING CORPS

Air Force and Army

The Departments of the Air Force and the Army maintain ROTC units at Clemson University. Their mission is to produce officers of high quality for technical and nontechnical careers in the U.S. Air Force and Army. Two, three, and four-year programs are available. The four-year program consists of the basic course for freshmen and sophomores and the advanced course for juniors and seniors.

Scholarships, available to selected ROTC students, pay for tuition, books, and laboratory expenses, in addition to a variable stipend ranging from \$250–400 per month during the school year. Nonscholarship advanced cadets also receive a stipend. Basic course credit may be awarded to students having prior military service.

Selected advanced Air Force cadets receive flight training at government expense. Reserve or National Guard duty can be guaranteed by the U.S. Army.

Cadets who complete the Advanced or Professional Course and satisfy commissioning requirements are appointed Second Lieutenants. Ample opportunity exists for graduate study in both services, with temporary deferments possible.

HONOR ORGANIZATIONS

Clemson University has a number of academic honorary societies which recognize outstanding scholarship by students, faculty, and staff.

- Alpha Epsilon Delta (Pre-Medical)
- Alpha Epsilon Lambda (Graduate Students)
- Alpha Lambda Delta (Freshmen)
- Alpha Pi Mu (Industrial Engineering)
- Alpha Zeta (Agriculture)
- Beta Alpha Psi (Accounting)
- Blue Key (Juniors and Seniors)
- Calhoun Honors Society (Honors College)
- Chi Epsilon (Civil Engineering)
- Eta Kappa Nu (Electrical and Computer Engineering)
- Eta Sigma Gamma (Health Education)
- Golden Key National Honor Society (Juniors and Seniors)
- Kappa Delta Pi (Education)
- Keramos (Ceramic and Materials Engineering)
- Mortar Board (Seniors)
- Mu Beta Psi (Music)
- Omicron Delta Kappa (Leadership)
- Order of Omega (Seniors)
- Phi Kappa Phi
- Phi Psi (Textiles)
- Phi Sigma Pi (Honorary)

- Pi Delta Phi (French)
- Pi Tau Sigma (Mechanical Engineering)
- Psi Chi (Psychology)
- Sigma Tau Delta (English)
- Tau Beta Pi (Engineering)
- Tau Sigma Delta
- Upsilon Pi Epsilon (Computer Science)
- Xi Sigma Pi (Forestry)

CLEMSON UNIVERSITY EXPERIMENT STATION

The Clemson University Experiment Station is part of a nationwide system of scientists working to improve the quality of life for people in their home state, the nation, and the world.

Both undergraduate and graduate students work with researchers to develop science-based information needed to address issues such as agricultural productivity and profitability, economic and community development, environmental conservation, food safety and nutrition, and youth development.

Clemson scientists have been involved in agriculture and forestry research since 1889 when the University was founded. Today research is conducted in laboratories, farms, and forests on the Clemson campus and at five research and education centers strategically located in the state's distinct soil and climate regions. In addition, Clemson researchers collaborate with colleagues on studies that span the globe.

This research has produced more than 100 new varieties of food and fiber crops, as well as 35 patents. More than 100 scientists, in addition to support staff, are working on 300 projects funded through federal, state, and private sources, including the U.S. Department of Agriculture, the U.S. Forest Service, the South Carolina General Assembly, and the National Science Foundation.

CLEMSON UNIVERSITY FOUNDATION

The Clemson University Foundation is a nonprofit organization which solicits, manages, and administers gifts from private sources to the academic programs at Clemson University.

Originally chartered in 1933, the Foundation is a primary component of the Advancement Program at the University. There are 37 elected members of the Board of Directors. Currently, 35 of the 37 elected directors are alumni of the University. In addition, the Board is comprised of seven automatic directors as well as 16 honorary directors.

The Foundation operates through an effective committee structure that reports through an Executive Committee to the Full Board. Committees direct their attention to investments, policy and bylaws, investment strategic planning, budgets, nominations, and audits. Fund-raising is managed by the Development Committee and a Campaign Executive Committee, if applicable, and is responsible for major gifts, planned gifts, college initiatives, and corporate and foundation solicitations. Affiliated foundations are the Clemson University Continuing Education and Conference Complex Corporation, Clemson University Real Estate Foundation,

Wallace F. Pate Foundation for Environmental Research and Education, and AMREC, LLC. As of June 2002, the Foundation managed over 1,000 endowments valued at \$236.8 million.

CLEMSON ALUMNI ASSOCIATION

The Clemson Alumni Association's action phrase is "Your Lifelong Connection to Clemson." Their mission is to serve, to inform, to involve. The Alumni Association works for the more than 100,000 alumni located around the world, sponsoring programs to provide a link between students of yesterday, today, and tomorrow.

In conjunction with volunteers and traveling University staff, Clemson Clubs and Clemson activities are conducted around the world. Alumni are kept informed through the award-winning *Clemson World* magazine and on the Web at alumni.clemson.edu. Students, alumni, and constituency programs, as well as publications and electronic resources, form the basis for an array of services offered to alumni, students, parents, and friends of the University.

All services of the National Alumni Association are coordinated out of the Alumni Center, a campus focal point built, furnished, and equipped entirely by gifts from alumni specifically for that purpose. The University Visitors Center, a gift of the Class of 1944, is adjacent to the Alumni Center and is an excellent stop for anyone visiting or returning to campus.

Alumni-sponsored awards programs such as Alumni Distinguished Service, Alumni Fellows, professorships, scholarships, and awards for outstanding teaching, research, and public service are among the prestigious awards given by the University.

Alumni employees coordinate the Alumni Career Services program and the activities of the open-membership student organization, Student Alumni Association. From the Welcome Back Festival held each August to the Senior Picnic held each May, the Alumni Association provides a lifelong connection to Clemson.

CAMPUS VISITS AND TOURS

The Visitors Center serves as a "front door" to the campus and offers a variety of informational services, including guided tours, audio-visuals, general and referral information, and publications about the University and surrounding area. The Visitors Center is located adjacent to the Alumni Center. Hours of operation are Monday–Friday, 8:00 A.M.–4:30 P.M.; Saturday, 9:00 A.M.–4:30 P.M.; and Sunday, 1:00–4:30 P.M. The Visitors Center is closed on University holidays.

Guided walking tours of the campus are led by students who are members of the all-volunteer University Guide Association. Tour times are Monday–Saturday at 9:45 A.M. and 1:45 P.M. and Sunday at 1:45 P.M. Tours begin and end at the Visitors Center. Visitors should try to arrive 10–15 minutes early. Reservations are recommended. For current information, visit www.clemson.edu/welcome/vcenter or call 864-656-4789.

ADMISSION

Admission information can be found on the Web at www.clemson.edu/admission/.

APPLICATION FORMS AND DATES

Application forms may be obtained by writing the Office of Admissions, Clemson University, 105 Sikes Hall, Box 345124, Clemson, SC 29634-5124. Application forms are available beginning August 2004. Freshman candidates are especially encouraged to submit preliminary applications and sit for the SAT I or ACT during the spring semester of their junior year. Copies of both the preliminary application and the application for admission are available on the Web at www.clemson.edu/attend/undgrd/index.htm.

Candidates should understand that admission is closed when all classroom space has been committed. The majority of freshman admission decisions are communicated during the middle of February. Transfer students seeking entrance in August are usually notified between February and July. Candidates must submit a nonrefundable fee of \$40 with the application. This fee is not applicable toward tuition and/or other University fees.

Application Deadlines	
For Freshman Applicants	
Spring semester	December 15
Fall semester	
Priority deadline	December 1
Final deadline	May 1
For Transfer Applicants	
Spring semester	December 1
Fall semester	July 1

FRESHMEN

Admission to the University is competitive and is based primarily upon high school curriculum, grades, class standing, and SAT I or ACT scores. An applicant's intended major and state residency also receive consideration. To apply for admission, a candidate must submit a high school transcript through his/her counselor and have results of the SAT I or ACT sent directly from the testing agency. In addition, all applicants for freshman admission should complete the following courses in high school:

English—4 credits

All four courses must have strong grammar and composition components, with at least one in English literature and at least one in American literature. College preparatory English I, II, III, and IV will meet these requirements.

Mathematics—3 credits

These include algebra I (for which applied mathematics I and II may count together as a substitute if a student successfully completes algebra II), algebra II and geometry.

Laboratory Science—3 credits

Two must be selected from biology I, chemistry I, or physics I.

Foreign Language—3 credits

All three must be earned in the same language.

Social Sciences—3 credits

American history is required. One half credit of government and one half credit of economics are also recommended.

Physical Education/ROTC—1 credit

Other—2 credits

One of these must be a fourth year of mathematics, laboratory science, or foreign language. Students interested in engineering are strongly encouraged to take a fourth year of mathematics. This course should be selected from precalculus, calculus, statistics, or discrete mathematics. The second credit must be in advanced mathematics, computer science, or a combination of these; or one unit of world history, world geography, or western civilization.

The SAT I or ACT examination scores, rank in class, academic preparation, and recommendation of the high school counselor will be weighed carefully in the decision-making process. The applicant's acceptance will be confirmed upon presentation of a final high school transcript indicating continued academic progress and graduation.

Entrance Examinations

All freshman candidates and some transfer students must submit scores from either the SAT I or ACT

For August enrollment, it is recommended that students complete the SAT I or ACT no later than the preceding December. Registration materials for these tests are readily available at high schools or can be obtained by contacting the College Board at (609) 771-7600 or (800) SAT-SCOR or the American College Testing Service at (319) 337-1313. All candidates must have their scores reported to Clemson by contacting the appropriate testing agency. The College Board's institutional code for Clemson is 5111. The ACT code for Clemson is 3842. Photocopies of student test reports or those submitted by third parties, such as high schools and colleges, are not accepted.

International Baccalaureate (IB)

Credit Policy

Clemson University endorses the International Baccalaureate (IB) Program and awards credit for IB Higher Level scores as indicated below.

IB Higher Level Examination	Level Grade	Credit Allowed Toward Degree	Credits
Art/Design	4, 5, 6, 7	ART 103	3
Biology	5, 6 7	BIOL 103, 104, or BIOL 101, 102 BIOL 101, 111	8 10
Business and Organization	5, 6, 7	MGT 301	3
Chemistry	5, 6, 7 5 6, 7	CH 101 (for majors requiring organic chemistry) CH 101 (for majors not requiring organic chemistry) CH 101, 102 (for majors not requiring organic chemistry)	4 4 8
Economics	5, 6, 7	ECON 211	3
English (Language A)	5, 6, 7 5, 6, 7	ENGL 208 ENGL 101 ¹	3 3
Foreign Language	4 5, 6, 7	FR 101, GER 101, ITAL 101, JAPN 101, RUSS 101, or SPAN 101 FR 101, 102, GER 101, 102, ITAL 101, 102, JAPN 101, 102, RUSS 101, 102, or SPAN 101, 102	4 8
History-European	5, 6, 7	HIST 173	3
History-Americas	5, 6, 7	HIST 101 and 102	6
Mathematics	5 6, 7	MTHSC 106 ² MTHSC 106	4 4
Music	5, 6, 7	Determined on individual basis	
Psychology	5, 6, 7	PSYCH 201	3
Theatre Arts	5, 6, 7	Determined on individual basis	

¹For students with a 5, 6, or 7 score, credit will be awarded after completing ENGL 103 with a C or better.

²For students taking the calculus sequence, MTHSC 106 and 108. Upon completion of MTHSC 108 with a grade of C or better, credit will be given for MTHSC 106.

College Board Advanced Placement Program

The College Board Advanced Placement Program (AP) gives highly motivated high school students an opportunity to begin their college careers dur-

ing the last year or two of high school. AP participants take college-level courses in high school, sit for nationally administered examinations in the subjects concerned, and submit test grades to Clemson for credit. Credit is awarded to those earning grades of 3, 4, or 5 on AP exams.

College Board Advanced Placement Examination		AP Grade	Credit Allowed Toward Degree	Credits
ECONOMICS	Microeconomics	3, 4, 5	ECON 211	3
	Macroeconomics	3, 4, 5	ECON 212	3
ENGLISH	Composition and Literature	3, 4	ENGL 101 ¹	3
		5	ENGL 101, 102	6
	Language and Composition	3, 4	ENGL 101	3
		5	ENGL 101, 102	6
	Both Tests	3, 4 on each	ENGL 101, 102	6
GOVERNMENT	American Government	3, 4, 5	PO SC 101	3
	Comparative Government	3, 4, 5	PO SC 102	3
HISTORY/ GEOGRAPHY	American History	3, 4, 5	HIST 101, 102	6
	European History	3, 4, 5	HIST 173	3
	Human Geography	3, 4, 5	GEOG 101	3
	World History	3	HIST 193	3
HUMANITIES	Music Theory	3, 4, 5	MUSIC 205	3
	Art History	3, 4, 5	A A H 210	3
	Studio Drawing	3, 4, 5	ART 205	3
	General Studio	3, 4, 5	ART 103	3
LANGUAGES	French Language	3, 4, 5	FR 101, 102	8
	French Literature	3	FR 101, 102	8
		4	FR 101, 102, 201	11
		5	FR 101, 102, 201, 202	14
	German Language	3, 4, 5	GER 101, 102	8
	Latin (either test)	3	LATIN 101, 102, 201	11
		4, 5	LATIN 101, 102, 201, 202	14
	Spanish Language	3, 4, 5	SPAN 101, 102	8
	Spanish Literature	3	SPAN 101, 102	8
		4	SPAN 101, 102, 201	11
		5	SPAN 101, 102, 201, 202	14
MATHEMATICS	Calculus AB	3, 4, 5	MTHSC 106	4
	Calculus BC	3, 4, 5 ²	MTHSC 106, 108	8
	Statistics	3, 4	MTHSC 203	3
		5	MTHSC 101, 203	6
PSYCHOLOGY	Psychology	3, 4, 5	PSYCH 201	3
SCIENCE	Biology	3	BIOL 103, 104	8
		4, 5	BIOL 110, 111	10
	Chemistry	3, 4, 5	CH 101, 102	8
	Computer Science A	3, 4, 5	CP SC 101	4
	Computer Science AB	3, 4 ³	CP SC 101	4
	Computer Science AB	5	CP SC 101, 102	8
	Environmental Science	3, 4, 5	EN SP 200	3
	Physics B ⁴	3, 4, 5	PHYS 207, 208	8
	Physics C (Mechanics)	3, 4, 5	PHYS 122, 124	4
	Physics C (Electrical and Magnetism)	3, 4, 5	PHYS 221, 223	4

¹Students who earn a score of 3 or 4 should register for ENGL 103.

²Students who earn a score of 2 on the Calculus BC examination, but have earned a score of 3 (or better) on the AB subscore of the BC examination, may receive credit for MTHSC 106.

³Students who earn a score of 4 on Computer Science may request a personal interview with a departmental representative to determine whether credit will be given for CP SC 102.

⁴Students enrolling in curricula requiring calculus-based physics (PHYS 122, 221, 222, 223, 224), but who earn a grade of 5 on Physics B, will be asked to meet with a departmental representative for further evaluation and placement counseling.

Placement Tests

Mathematics Placement—Freshmen mathematics placement is determined by the applicant's score on the Clemson Mathematics Placement Test (CMPT). The CMPT is required for all freshmen and transfer students. Failure to satisfactorily complete the CMPT will result in placement in preparatory work that, in most cases, will not apply toward the general education mathematics requirement. Placement will be adjusted as needed after AP and IB scores have been received by Clemson.

Foreign Language Placement—Applicants desiring advanced placement in a foreign language may take the College Board's SAT II Subject Tests, Advanced Placement (AP) Examinations, or the International Baccalaureate (IB) Higher Level Examination. The Department of Languages also offers placement exams which students may take during summer orientation. SAT II scores of 450 or higher enable students to exempt one or more language courses. These students will receive credit following the successful completion (grade of C or better) of a qualifying course at Clemson.

GED

Candidates submitting General Educational Development (GED) credentials in lieu of a high school diploma must be 19 years of age or older. Official GED score results must be received directly from the General Educational Development Testing Service along with an official copy of the high school transcript and SAT I or ACT scores. Applicants presenting the GED will be reviewed by the Undergraduate Admissions Committee.

Appeals

Any freshman or transfer candidate who is denied admission may appeal for reconsideration provided the student (1) presents new information, such as improved grades and/or class rank, improved SAT I or ACT scores; and (2) submits a letter outlining the rationale for the appeal. All appeals will be reviewed by the Office of Admissions. In some instances, appeals will be referred to the Undergraduate Admissions Committee.

Freshman students who are accepted to and enrolled in Clemson University in a conditional admissions program through the appeals process must meet the conditions of their admission or be subject to disenrollment.

Admissions Exceptions

If it is not possible to make a positive decision on the basis of previous academic performance and SAT I or ACT scores, other factors, such as special talents or high school profile, may be considered. Where appropriate, the Office of Admissions will refer such cases to the Undergraduate Admissions Committee. Student athletes who do not meet regular admissions standards may be admitted if they meet Atlantic Coast Conference (ACC) and National Collegiate Athletic Association (NCAA) eligibility requirements.

TRANSFER STUDENTS

Transfer admission is moderately competitive. To increase their chances for admission, potential students should have the following qualifications:

- completion of a year of college study with 30 semester hours (or 45 quarter hours) of transferable credit,
- a minimum 2.5 grade-point ratio (3.0 preferred),
- freshman level math, science, and English requirements for the intended major at Clemson.

Application deadlines are December 1 for consideration for the spring semester and July 1 for consideration for the fall semester. In most cases, admission decisions will be made once the year of college study is completed. Summer school applicants should have all credentials sent at least two weeks prior to the beginning of the term. Admission is closed when all classroom space has been committed.

Transfer Credit

Coursework completed with a grade of C or better at other regionally accredited institutions, including correspondence courses, telecourses, and exempted courses, will be evaluated for transfer in terms of equivalent courses included in the Clemson curriculum of the student's choice. This does not guarantee that all courses taken at other institutions will be accepted for transfer. The acceptability of each course or exemption will be based on an evaluation by the faculty concerned. Coursework earned at different institutions will not be joined to equate with one Clemson course. No course taken at a nonbaccalaureate-degree granting institution may be used as an equivalent or substitute for any 300- or 400-level Clemson course.

Learning experiences including, but not limited to, military service schools, non-collegiate sponsored instruction, work related experiences, etc. will not be evaluated for transfer; however, enrolled students may request credit by examination from the appropriate department for any non-transferable learning experience. For additional information, see *Advanced Placement and Credit by Examination* on page 24.

Students transferring may select the curriculum that was outlined in the *Clemson University Undergraduate Announcements* at the time they entered the sending institution, provided they have been in continuous enrollment. Further, transfer students may select any curriculum adopted subsequent to that initial curriculum. After enrolling at Clemson, if transfer students change from one major to another, they will complete all of the requirements included in the new curriculum that are in effect at the time of the change. If all work toward a degree is not completed within six years after the initial enrollment at the sending institution, the student may be required to take additional courses.

Transfer: State Policies and Procedures

Section 10-C of the South Carolina School-to-work Transition Act (1994) stipulates that the Council of College and University Presidents and the State Board for Technical and Comprehensive Education operating through the Commission on Higher Education, shall develop better articulation of associ-

ate and baccalaureate degree programs. To comply with this requirement, the Commission upon the advice of the Council of Presidents established a Transfer Articulation Policy Committee composed of four-year institutions' vice presidents for academic affairs and the Associate Director for Instruction of the State Board for Technical and Comprehensive Education. The principal outcomes derived from the work of that committee and accepted by the Commission on Higher Education on July 6, 1995 were

- an expanded list of 72 courses which will transfer to four-year public institutions of South Carolina from the two-year public institutions,
- a statewide policy document on good practices in transfer to be followed by all public institutions of higher education in the State of South Carolina, which was accepted in principle by the Advisory Committee on Academic Programs and the Commission,
- six task forces on statewide transfer agreements, each based in a discipline or broad area of the baccalaureate curriculum.

In 1995 the General Assembly passed Act 137 which stipulated further that the South Carolina Commission on Higher Education "notwithstanding any other provision of law to the contrary, shall have the following additional duties and functions with regard to the various public institutions of higher education." These duties and responsibilities include the Commission's responsibility to "establish procedures for the transferability of courses at the undergraduate level between two-year and four-year institutions or schools."

Act 137 directs the Commission to adopt procedures for the transfer of courses from all two-year public to all four-year public institutions of higher education in South Carolina. Proposed procedures are listed below. Unless otherwise stated, these procedures shall become effective immediately upon approval by the Commission and shall be fully implemented, unless otherwise stated, by September 1, 1997.

Statewide Articulation of 72 Courses

1. The Statewide Articulation Agreement of 72 courses already approved by the South Carolina Commission on Higher Education for transfer from two- to four-year public institutions (See Appendix A) shall be applicable to all public institutions, including two-year institutions and institutions within the same system. In instances where an institution does not have synonymous courses to ones on this list, it shall identify comparable courses or course categories for acceptance of general education courses on the statewide list.

Admissions Criteria, Course Grades, GPAs, Validations

2. All four-year public institutions shall issue annually in August a transfer guide covering at least the following items:

A. The definition of a transfer student and requirements for admission both to the institution and, if more selective, requirements for admission to particular programs.

B. Limitations placed by the institution or its programs for acceptance of standardized examinations (e.g., SAT, ACT) taken more than a given

time ago, for academic coursework taken elsewhere, for coursework repeated due to failure, for coursework taken at another institution while the student is academically suspended at his/her home institution, and so forth.

C. Institutional and, if more selective, programmatic maximums of course credits allowable in transfer.

D. Institutional procedures used to calculate student applicants' GPAs for transfer admission. Such procedures shall describe how nonstandard grades (withdrawal, withdrawal failing, repeated course, etc.) are evaluated; and they shall also describe whether all coursework taken prior to transfer or just coursework deemed appropriate to the student's intended four-year program of study is calculated for purposes of admission to the institution and/or programmatic major.

E. Lists of all courses accepted from each technical college (including the 72 courses in the Statewide Articulation Agreement) and the course equivalencies (including "free elective" category) found on the home institution for the courses accepted.

F. Lists of all articulation agreements with any public South Carolina two-year or other institution of higher education together with information about how interested parties can access these agreements.

G. Lists of the institution's Transfer Officer(s) personnel together with telephone and FAX numbers and office address.

H. Institutional policies related to "academic bankruptcy" (i.e. removing an entire transcript or parts thereof from a failed or underachieving record after a period of years has passed) so the re-entry into the four-year institution with course credit earned in the interim elsewhere is done without regard to the student's earlier record.

1. "Residency requirements" for the minimum number of hours required to be earned at the institution for the degree.

3. Coursework (individual courses, transfer blocks, statewide agreements) covered within these procedures shall be transferable if the student has completed the coursework with a "C" grade (2.0 on a 4.0 scale) or above, but transfer of grades does not relieve the student of the obligation to meet any GPA requirements or other admissions requirements of the institution or program to which application has been made.

A. Any four-year institution which has institutional or programmatic admissions requirements for transfer students with cumulative grade point averages (GPAs) higher than 2.0 on a 4.0 scale shall apply such entrance requirements equally to transfer students from regionally accredited South Carolina public institutions regardless of whether students are transferring from a four-year or two-year institution.

B. Any multi-campus institution or system shall certify by letter to the Commission that all coursework at all of its campuses applicable to a particular degree program of study is fully acceptable in transfer to meet degree requirements in the same degree program at any other of its campuses.

4. Any coursework (individual courses, transfer blocks, statewide agreements) covered within these procedures shall be transferable to any public institution without any additional fee and without any further encumbrance such as a "validation exami-

nation," "placement examination/instrument," "verification instrument," or any other stricture, notwithstanding any institutional or system policy, procedure, or regulation to the contrary.

Transfer Blocks, Statewide Agreements, Completion of the AA/AS Degree

5. The following Transfer Blocks/Statewide Agreements taken at any two-year public institution in South Carolina shall be accepted in their totality toward meeting baccalaureate degree requirements at all four-year public institutions in relevant four-year degree programs, as follows:

- Arts, Humanities, and Social Sciences—established curriculum block of 46–48 semester hours,
- Business Administration—established curriculum block of 46–51 semester hours,
- Engineering—established curriculum block of 33 semester hours,
- Science and Mathematics—established curriculum block of 48–51 semester hours,
- Teacher Education—established curriculum block of 38–39 semester hours for Early Childhood, Elementary, and Special Education students only. Secondary education majors and students seeking certification who are not majoring in teacher education should consult the Arts, Humanities, and Social Sciences or the Math and Science transfer blocks, as relevant, to assure transferability of coursework.
- Nursing—by statewide agreement, at least 60 semester hours shall be accepted by any public four-year institution toward the baccalaureate completion program (BSN) from graduates of any South Carolina public associate degree program in nursing (ADN), provided that the program is accredited by the National League for Nursing and that the graduate has successfully passed the National Licensure Examination (NCLEX) and is a currently licensed Registered Nurse.

(For complete texts and information about these statewide transfer blocks/agreements, see *Appendix B*.)

6. Any "unique" academic program not specifically or by extension covered by one of the statewide transfer blocks/agreements listed in #4 above shall either create its own transfer block of 35 or more credit hours with the approval of CHE staff or shall adopt either the Arts/Social Sciences/Humanities or the Science/Mathematics block by September 1996. The institution at which such program is located shall inform the staff of the CHE and every institutional president and vice president for academic affairs about this decision.

7. Any student who has completed either an Associate of Arts or Associate of Science degree program at any public two-year South Carolina institution which contains within it the total coursework found in either the Arts/Social Sciences/Humanities Transfer Block or the Math/Science Transfer Block shall automatically be entitled to junior-level status or its equivalent at whatever public senior institution to which the student might have been admitted. (Note: As agreed by the Committee on Academic Affairs, junior status applies only to campus activities such as priority order for registration for courses, residence hall assignments, parking, athletic event tickets, etc. and not in calculating

academic degree credits.)

Related Reports and Statewide Documents

8. All applicable recommendations found in the Commission's report to the General Assembly on the School-to-work Act (approved by the Commission and transmitted to the General Assembly on July 6, 1995) are hereby incorporated into the procedures for transfer of coursework among two- and four-year institutions. (See *Appendix C*.)

9. The policy paper entitled *State Policy on Transfer and Articulation*, as amended to reflect changes in the numbers of transfer blocks and other Commission action since July 5, 1995, is hereby adopted as the statewide policy for institutional good practice in the sending and receiving of all course credits to be transferred. (See *Appendix D*.)

Assurance of Quality

10. All claims from any public two- or four-year institutions challenging the effective preparation of any other public institution's coursework for transfer purposes shall be evaluated and appropriate measures shall be taken to reassure that the quality of the coursework has been reviewed and approved on a timely basis by sending and receiving institutions alike. This process of formal review shall occur every four years through the staff of the Commission on Higher Education, beginning with the approval of these procedures.

Statewide Publication and Distribution of Information on Transfer

11. The staff of the Commission on Higher Education shall print and distribute copies of these Procedures under their acceptance by the Commission. The staff shall also place this document and the Appendices on the Commission's home page on the Internet under the title "Transfer Policies."

12. By September 1 of each year, all public four-year institutions shall on their own home page on the Internet under the title "Transfer Policies"

A. Print a copy of this entire document (without appendices).

B. Print a copy of their entire transfer guide.

C. Provide to the staff of the Commission in satisfactory format a copy of their entire transfer guide for placing on the Commission's home page on the Internet.

13. By September 1 of each year, the staff of the State Board for Technical and Comprehensive Education shall on its home page on the Internet under the title "Transfer Policies"

A. Print a copy of this document (without appendices).

B. Provide to the Commission staff in format suitable for placing on the Commission's home page on the Internet a list of all articulation agreements that each of the sixteen technical colleges has with public and other four-year institutions of higher education, together with information about how interested parties can access those agreements.

14. Each two-year and four-year public institutional catalog shall contain a section entitled "Transfer: State Policies and Procedures." Such section at a minimum shall

A. Publish these procedures in their entirety (except appendices).

B. Designate a chief Transfer Officer at the institution who shall

—provide information and other appropriate support for students considering transfer and recent transfers.

—serve as a clearinghouse for information on issues of transfer in the State of South Carolina.

—provide definitive institutional rulings on transfer questions for the institution's students under these procedures.

—work closely with feeder institutions to assure ease in transfer for their students.

C. Designate other programmatic Transfer Officers(s) as the size of the institution and the variety of its programs might warrant.

D. Refer interested parties to the institutional Transfer Guide.

E. Refer interested parties to the institution's and the Commission on Higher Education's home pages on the Internet for further information regarding transfer.

In order to comply with these state guidelines, the following information is noted relative to Clemson University:

Transfer Admissions Officers

Becky D. Pearson, Associate Director of Admissions
Sue Whorton, Assistant Director of Admissions
Kathryn Rice, Transfer Credit Coordinator

105 Sikes Hall
Clemson University
Box 345124
Clemson, SC 29634-5124
Phone: (864) 656-2287
FAX: (864) 656-2464

Additional information regarding transfer is contained in the brochure *S. C. Technical College Transfer Guide*, available through the Office of Admissions at the address above. Prospective transfer students are also encouraged to refer to the University's Web site at www.clemson.edu or the South Carolina Commission on Higher Education's Web site at www.che400.state.sc.us.

College Board College-Level Examination Program (CLEP)

This program has very limited recognition at Clemson. A few departments accept credit for CLEP subject-matter examinations; however, CLEP General Examinations are not recognized. Credit is awarded for introductory-level courses according to criteria established by the following departments: Chemistry, English (composition only), and Mathematical Sciences (algebra and trigonometry only). Numerical scores plus essays, required when offered as part of a CLEP examination, will be evaluated by the appropriate department. CLEP is designed primarily for adults with nontraditional learning experiences.

ADMISSIONS DEPOSIT

With the exception of certain University scholarship recipients, all accepted freshman and transfer candidates for fall semester are required to submit a nonrefundable \$100 admissions deposit. This deposit is applicable toward tuition and other University fees.

HOUSING

All 2004-2005 entering freshmen are guaranteed on-campus housing. The University housing policy requires all freshmen to live in University housing, unless they live with a parent or other close relative. New transfer students are offered University housing as space permits.

ORIENTATION PROGRAMS

The University offers a series of orientation programs during the summer for freshmen, transfer students, and their parents. All accepted students are expected to attend one of the sessions. During orientation, students will have an opportunity to discuss their educational objectives with an advisor, to register for the fall semester, and to learn about student life and other co-curricular activities. Transfer students will have their transcripts evaluated and select appropriate courses for their first semester at Clemson. The student program fee is \$70 per student, subject to change.

The 2004 summer orientation dates for freshmen are June 14-15, 17-18, 21-22, 24-25, 28-29, July 1-2, and 8-9. New transfer students may attend either the June 16 or July 7 program. Although students are strongly encouraged to attend summer orientation, abbreviated make-up sessions are held on August 15 for freshmen and their parents and on August 16 for transfer students and their parents. International students are expected to attend the session held on August 16 after attending the mandatory orientation for all international students which is conducted by International Studies, Programs, and Services.

INTERNATIONAL UNDERGRADUATES

Admissions services for undergraduate international students are provided by the Office of Admissions. International students who come from abroad or transfer from another school must meet academic, language, and financial qualifications as determined by Clemson University. The SAT I or ACT is required of all international applicants (freshman or transfer). The Test of English as a Foreign Language (TOEFL) is required of applicants from countries where English is not the native language. Financial qualifications are determined by the submission of financial assessment and bank statements verifying adequate funding. Student visa services are provided by the Office of International Studies, Programs, and Services.

SPECIAL STUDENT STATUS

The special student classification is designed for high school graduates, 19 years of age or older, who wish to take a limited number of courses for personal or professional development. This program is not appropriate for individuals who are interested in earning an undergraduate degree. In addition, it is not a "trial admission" status or one for candidates who apply too late to submit credentials for consideration for regular admission. Applicants denied regular admission to Clemson are not eligible to apply as special students.

None of the usual credentials supporting an application are required of special student applicants. A cumulative maximum of 18 undergraduate credit hours may be taken. Contact the Office of Admissions, 105 Sikes Hall, Clemson, SC 29634-5124.

READMISSION OF FORMER UNDERGRADUATES

Undergraduate students who have previously attended Clemson and wish to return must secure an application for reentrance from the Registrar's Office. Students are readmitted into the major they were in when they last attended Clemson. Change of major forms are available in the Enrolled Student Services Office. Former students must meet the catalog curriculum requirements for graduation in effect at the time of their return. Students are required to satisfy the University's general education requirements in addition to curricular requirements. Any variations in curricular requirements will be considered under the substitution procedures. If all work toward a degree is not completed within six years after entrance, the student may be required to take additional courses. Other information can be obtained from the Registrar's Office.

POSTBACCALAUREATE

Students may be accepted as postbaccalaureate if they apply to a graduate degree program but do not have the appropriate academic background. Students must be recommended by the appropriate department or program chair and should meet all other requirements for admission to the degree program with respect to grade-point ratio and standardized test scores. Postbaccalaureate students who are denied admission because of failure to meet the minimum requirements have access to the same appeal procedure as other students applying for admission.

Applicants will be classified as postbaccalaureate if they are not qualified to take at least one graduate course per semester which can be included in the minimum hours required for the graduate degree. Additionally, students required to complete eighteen or more semester hours of undergraduate credits prior to enrolling in graduate credits will be classified as postbaccalaureate. The postbaccalaureate status will remain in effect until the number of required undergraduate credit hours is less than or equal to eighteen and the student is qualified to take, each semester, a graduate course which can be included in the minimum hours required for the graduate degree. Departments or students may request postbaccalaureate status even though the above criteria are satisfied.

Once postbaccalaureate students become eligible for classification as graduate students, the decision as to eventual admission status (full or provisional) will be made based on criteria utilized by the department and Graduate School for all other applicants to the degree program. Postbaccalaureate students are expected to maintain a B average and receive no grade lower than C to qualify for admission to a graduate program.

Postbaccalaureate students can enroll in the same number of credits per semester as undergraduate students but cannot enroll in graduate courses or receive graduate assistantships. No degree or certificate shall be awarded to students in a postbaccalaureate status, and such students who subsequently wish to obtain an additional baccalaureate degree must apply through the Office of Admissions. The applicability of credits earned toward the undergraduate degree will be determined by the policy pertaining to transfer students. Tuition and fees for postbaccalaureate students shall be those applicable to undergraduate students and are subject to out-of-state fees, if applicable.

Students possessing undergraduate degrees or graduate degrees who wish to enroll in undergraduate courses for reasons other than future admission to graduate study shall not be classified as postbaccalaureate and shall be governed by policies established by the Office of Admissions.

FINANCIAL INFORMATION

The annual State Appropriation Act imposes the general requirement that student fees be fixed by the University Board of Trustees. The Act imposes two specific requirements on the Board: (1) In fixing fees applicable to academic and general maintenance and operation costs, the Board must maintain a minimum student fee not less than the fee charged the previous year. (2) In fixing fees applicable to dormitory rental, dining halls, laundry, infirmary, and all other personal subsistence expenses, the Board must charge students an amount sufficient to fully cover the cost of providing such facilities and services.

The tuition and fees for all students—full or part time and auditing—are shown at right. Satisfactory settlement of all expenses is a requirement for completing each semester's class registration, and no student is officially enrolled until all past due accounts have been satisfied. Financial aid cannot be used to satisfy balances forward from a prior academic year.

In special cases the University will accept, at the beginning of a semester, a noninterest-bearing promissory note for a portion of the semester housing and semester meal plan fee. Amounts up to \$450 for room rent and \$450 for 5- or 7-day meal plans may be included in the note. In such cases, a note for the fall semester charges will be due October 1, and for the spring semester, March 1. Failure to pay the note when due will result in the assessment of late fees, including collection costs, denial of future deferred payment note privileges, and termination of board plan and/or cancellation of housing contract.

Currently enrolled students who expect to continue enrollment may make housing reservations by paying a \$150 housing advance payment and by pre-registering on-line during the spring semester at a time designated by the Housing Office.

New students who are offered on-campus housing accommodations must pay a nonrefundable \$35 housing application fee and a \$100 admissions deposit. The admissions deposit is deducted from the amount otherwise due for the first semester expenses. (Note: Policies regarding priority to/offering of on-campus housing are subject to change.)

TUITION AND FEES

Late Enrollment Service Charge

Registration for classes is scheduled for specific days, and definite procedures are outlined to avoid the problems incident to late registration. A student has not completed registration until all required steps have been taken. Any student failing to complete registration on the specified class registration days will incur a late enrollment charge, which begins at \$25 and increases \$5 each day.

Full-time Fees

Students must be enrolled in 12 semester hours to pay full-time fees. Students enrolled in less than 12 hours or who drop below 12 hours may become ineligible for some student services, financial aid, or other programs.

TUITION AND FEES

Actual charges for 2004-2005 are not known when this catalog is printed. The charges reflected below are for 2003-2004 and are subject to change as conditions warrant.

	<i>Resident Per Semester</i>	<i>Nonresident Per Semester</i>
Full-time undergraduate academic fee	\$3,479.00	\$7,278.00
Part-time undergraduate academic fee (per semester hour)	288.00	600.00
Undergraduate auditing academic fee (per semester hour)	144.00	300.00
Undergraduate staff academic fee (per semester hour; first four hours free)	288.00	
Graduate assistant academic fee	918.00	918.00
Laboratory fee (per laboratory)	75.00-200.00 ...	75.00-200.00
Health fee (required if enrolled in seven or more hours on campus, regardless of housing arrangements)	105.00	105.00
Residence Halls (per semester)	<i>Regular</i>	<i>Single</i>
Johnstone (except Annex A)	1,035.00	1,555.00
Benet, Bowen, Bradley, Cope, Donaldson, Geer, Johnstone A Annex, Norris, Sanders, Wannamaker, Young	1,185.00	1,780.00
Barnett, Byrnes, Lever, Manning, Mauldin, Smith	1,310.00	1,965.00
Clemson House (room)	1,345.00	2,020.00
Holmes and McCabe	1,510.00	
Stadium Suites	1,725.00	
Temporary Housing	1,000.00	
Apartments (per semester)		
Calhoun Courts (four occupants)	1,590.00	
Clemson House	1,390.00	
Fraternity Area Village	2,095.00	
Lightsey Bridge	1,665.00	
Lightsey Bridge II	2,115.00	
Thornhill Village (two occupants)	1,800.00	
Thornhill Village (four occupants)	1,420.00	
Family Housing		<i>Per Month</i>
Townhouses		375.00
Duplex-2 Bedroom		390.00
Duplex-3 Bedroom		455.00
Faculty Houses		500.00
Faculty Houses (Renovated)		605.00
Thornhill Graduate Apartments		
9 month		385.00
12 month		355.00
Board Plans ¹		<i>Per Semester</i>
Any Ten (10 meals), Monday-Sunday		901.00
Plus Any Ten (includes \$175 in Paw points)		1,072.00
Any 15 (15 meals), Monday-Sunday		996.00
Plus Any 15 (includes \$100 in Paw points)		1,072.00
Seven-day (unlimited access)		1,072.00
Plus Commuter 50 (any 50 meals per semester plus \$250 in Paw points)		538.00
Tiger Stripe Account minimum (declining balance)		50.00

¹All first-year freshmen who live in University housing (excluding apartments with kitchens) are required to subscribe to one of the first five board plans for their first two semesters. All other students have the option of selecting on a semester basis or paying the prevailing cash price for individual meals. The Plus Commuter 50 and Tiger Stripe account do not satisfy the freshman requirement.

Part-time Fees

Students taking less than 12 semester credit hours will be charged each semester according to the above schedule. These fees do not provide for admission to athletic events, concert series, and other such activities.

Returned Checks

A check or charge card given in payment of University expenses that is returned unpaid by the bank immediately creates an indebtedness to the University. University Revenue and Receivables, G-12 Sikes Hall, administers matters related to the collection of all returned checks for students and nonstudents.

University Revenue and Receivables will redeposit returned checks in payment of academic fees for the fall and spring semesters. A \$25 returned check charge will be assessed for each returned item in accordance with state laws. Students with returned items for payment of academic fees are also subject to a late payment fee of \$5 per calendar day, not to exceed \$350, beginning on the day after the last day of late registration. If the note was returned to the University in a timely manner with no response by the student or drawer, a written request to disenroll the student may be made to the Registrar. If the request is approved, the percentage of refund will be applied to the debt. If the check is returned

after the mid-point of the semester with no response, a decision will be made by the Director of University Revenue and Receivables and the Registrar as to the effects of disenrollment. At this point, the student will owe 100% of tuition and fees, even if he/she has been disenrolled. The University may restrict subsequent payment for academic and other fees by accepting only cash, certified checks, cashier's checks, or money orders.

Any individual who uses a two-party check for payment of University expenses will be held responsible for that check if it is returned unpaid by the bank. Checks used as payment for various University services, such as meal plans, housing, etc., that are later returned unpaid by the bank, give the University the right to cancel such services and cause forfeiture of any refund.

Any returned check not collected by the above procedures may be turned over to a collection agency and the indebtedness reported to a credit bureau. Collection costs will be added to the debt. Transcripts and diplomas will be withheld pending payment, and the debt may be deducted from state income tax refunds.

Abuse of check payment privileges may result in the restriction of such privileges for an indefinite period of time based on the frequency and/or dollar amount, as determined by University Revenue and Receivables.

Past Due Accounts

Any indebtedness to the University which becomes past due immediately jeopardizes the student's enrollment, and no such student will be permitted to re-enroll for an ensuing semester or summer term. Billing fees and/or collection costs may be added to the indebtedness. Further, any student who fails to pay all indebtedness, including collection costs, to the University may not be issued a transcript or diploma. Unresolved debts may be turned over to a collection agency, reported to a credit bureau, and deducted from state income tax refunds. Debts include but are not limited to, parking violations, library fines, rent, academic fees, and others.

Refund of Academic Fees

(Tuition, University Fee, and Medical Fee) for Students Withdrawing, Dropping to Part Time, or Part-time Students Dropping Credit Hours

No refunds will be made on a semester's tuition and fees after four weeks from the last day to register. In the case of a withdrawal from the University, refunds will be based on the effective date of the withdrawal. In the case of a withdrawal from a course, refunds will be based on the date the student drops the course using the on-line registration system. To be eligible for a refund, the student's request must be received by University Revenue and Receivables prior to the beginning of the next fall/spring semester or subsequent summer term. Beginning with the day following the last day to register, refunds for periods of four weeks or less during fall/spring semester shall be made on the following basis. Students receiving Title IV Financial Aid follow a different policy. Contact University Revenue and Receivables, G-08 Sikes Hall, for details.

Fall/Spring Semester

Period of Enrollment	Percent Refund
Registration day(s) in published calendar	100%
After last day to register: One week or less	80%
More than 1 but not more than 2 weeks	60%
More than 2 but not more than 3 weeks	40%
More than 3 but not more than 4 weeks	20%
More than 4 weeks	0%

Summer Sessions

Period of Enrollment	Length of Session Percent Refund			
	Less Than 3 wks.	3 wks.	5 or 6 wks.	More Than 6 wks.
Registration day(s) in published calendar	100%	100%	100%	100%
After last day to register: One week or less	0%	40%	60%	60%
More than 1 but not more than 2 weeks	0%	0%	20%	40%
More than 2 but not more than 3 weeks	0%	0%	0%	20%
More than 3 weeks	0%	0%	0%	0%

Students who sign contracts after July 25, 2004, are obligated to pay the entire academic year's rent unless they do not enroll. If a student's plans change and he/she re-enrolls after cancelling, the semester charge will be added back to his/her account. The entire \$150 advance payment is refunded only in cases where the University denies readmission. There will be no refund of University housing monies during the last six weeks of a semester. If any collection fees are assessed in the process of obtaining unpaid housing charges, the student will be responsible for the payment of those collection fees in addition to the unpaid housing charges.

Cancellation of contract after the start of each semester of the academic year

The contract may be terminated after the start of each semester for the following reasons only: withdrawal from school, marriage (no more than four weeks prior to the wedding date), or circumstances determined by the University to be sufficiently extenuating as to warrant cancellation. Documentary evidence will be required to show cause for cancellation. Any student qualifying for cancellation under one of these conditions will forfeit the first \$150 of that semester's rental fee or the prorated amount for the days of the semester that housing is held in reservation by that student, whichever is greater.

Cancellation of contract at the end of the first semester

The contract may be terminated at the end of the first semester without penalty for the following reasons: graduation, withdrawal from school, inability to continue enrollment due to a failure to meet academic requirements, completion of graduate requirements, failure to enroll a second semester, participation in Cooperative Education during second semester, or participation during the second semester in any program required by the University that takes the student away from the main campus. The contract may be cancelled at the end of the first semester with a \$150 contract cancellation charge for the following reasons: marriage or circumstances determined by the University to be sufficiently extenuating as to warrant cancellation. The contract may also be cancelled at the end of the first semester by paying 50% of the first semester's rental fee ("buyout" option).

Refund of Dining Hall Fees

See the section on Dining Services on page 21.

Refund of Housing Fees

Cancellation of the contract prior to the start of the academic year

New Freshmen, New Graduate Students, New Transfer Students—If written notice of cancellation is received by the Housing Office on or before July 25, 2004, the contract is cancelled with no additional charge. After July 25, 2004, the contract is binding, and students are obligated to pay rent for the entire academic year unless they fail to enroll.

Continuing Undergraduate and Graduate Students, Co-op Students, Former Students Returning—If written notice of cancellation is received by the Housing Office on or before June 1, 2004, the contract is cancelled, and \$100 of the \$150 advance payment is refunded, minus any indebtedness to the University. Students who are not required to pay the \$150 will be charged \$50. Refunds, if applicable, will show as a credit on the following semester's bill. If the student fails to enroll the following semester, a refund check will be issued only after that semester begins. If written notice of cancellation is received by the Housing Office on or between June 2 and July 25, 2004, the contract is cancelled, but no portion of the \$150 advance payment is refunded. Students who are not required to make a \$150 advance payment will be charged \$150 upon cancellation. After July 25, 2004, the contract is binding, and students are obligated to pay the entire academic year's rent unless they fail to enroll. In such cases, all pre-paid rent, less \$150, will be refunded.

Refunds of Financial Aid for Students Withdrawing from the University

Refunds of academic fees are made in accordance with semester and summer session refund policies. First semester freshmen and first semester transfers receiving Title IV financial aid are under a different policy based on federal guidelines. Details are available in G-08 Sikes Hall. University housing refunds are made according to the policy above. Meal plan refunds are made on a pro rata basis.

Since financial aid is expected to meet or help meet educational costs, any academic fee, housing, or meal-plan fee for students withdrawing from the University up to the amount of financial aid received for that semester or summer session, will be refunded to the Financial Aid Program(s) from which the student received assistance.

Students receiving Title IV Funds (Federal Pell Grant, Federal SEOG, Federal Perkins, Federal Stafford Loans—unsub or sub) or Federal Plus Loans who withdraw from the University are subject to the Return of Title IV Funds regulations. Students with funds from any of these programs earn their financial aid dollars while enrolled. If a student withdraws prior to completing 60% of a term, a prorated portion of the federal financial aid dollars must be considered unearned and returned to the federal programs and could cause students to owe the University a significant amount upon withdrawal.

In addition to the amount of federal aid that Clemson must return, students who received financial aid for other educational costs, including off-campus living expenses, may be required to repay a portion of those funds to the federal programs. Failure to return aid owed to the federal aid programs may result in loss of eligibility for federal aid assistance.

Federal aid funds to be returned are distributed to the programs in the following order:

- Unsubsidized Federal Stafford Loan
- Subsidized Federal Stafford Loan
- Federal Perkins Loan
- Federal Plus Loan
- Federal Pell Grant
- Federal SEOG
- Other Title IV Programs
- Non-Title IV Programs

After the refund has been applied to the Title IV and non-Title IV programs, any refund balance will be refunded to the student.

If debts were incurred before withdrawing, such as bad checks, unpaid traffic or library fines, etc., the refund will cover these obligations first. Academic fees, housing, and meal-plan refunds for students withdrawing will be paid to the student.

RESIDENT TUITION AND FEES

Application for Resident Status

Any undergraduate student or prospective student whose status concerning entitlement to payment of in-state tuition and fees is uncertain has the responsibility of securing a ruling from the University by providing all relevant information on special application forms. These forms can be obtained from the Student Financial Aid Office, G-01 Sikes Hall, and are to be completed and returned to that office at least two weeks prior to registration for any semester or summer term for which the student is attempting to qualify for payment of the in-state tuition and fee rate.

Entitlement

Eligibility for payment of in-state tuition and fees shall be determined under the provisions of Sections 59-112-10 through 59-112-100, South Carolina Code of Laws, 1976, as amended. This law is set forth in its entirety as follows (subject to further amendment by the General Assembly).

Statutes

59-112-10—Definitions. As used in this chapter:

A. The words "State Institution" shall mean those post-secondary educational institutions under the jurisdiction of the following: (1) Board of Trustees, Clemson University; (2) Board of Trustees, Medical University of South Carolina; (3) Board of Trustees, South Carolina State College; (4) State College Board of Trustees; (5) Board of Visitors, The Citadel; (6) Board of Trustees, University of South Carolina; (7) Board of Trustees, Winthrop College; and (8) State Board of Technical and Comprehensive Education.

B. The word "student" shall mean any person enrolled for studies in any state institution.

C. The word "residence" or "reside" shall mean continuous and permanent physical presence within this State, provided, that temporary absences for short periods of time shall not affect the establishment of a residence.

D. The word "domicile" shall mean a person's true, fixed, principal residence and place of habitation; it shall indicate the place where such person intends to remain, and to which such person expects to return upon leaving without establishing a new domicile in another state. For purposes of this section one may have only one legal domicile; one is presumed to abandon automatically an old domicile upon establishing a new one. Housing provided on an academic session basis for students at State institutions shall be presumed not to be a place of principal residence, as residency in such housing is by nature temporary.

E. The words "in-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are domiciled in South Carolina in accordance with this act; the words "out-of-state rates" shall mean charges for tuition and fees established by State Institutions for persons who are not domiciled in South Carolina in accordance with this act.

F. The words "independent person" shall mean a person in his majority, or an emancipated minor, whose predominant source of income is his own earnings or income from employment, investments, or payments from trusts, grants, scholarships, loans, or payments of alimony or separate maintenance made pursuant to court order.

G. The words "dependent" or "dependent person" mean: (1) one whose financial support is provided not through his own earnings or entitlements, but whose predominant source of income or support is payments from a parent, spouse, or guardian, and who qualifies as a dependent or an exemption on the federal tax return of the parent, spouse, or guardian; or (2) one for whom payments are made, under court order, for child support and the cost of his college education by an independent person meeting the provisions of Section 59-112-20 A or B. However, the words "dependent" or "dependent person" do not include a spouse or former spouse who is the recipient of alimony or separate maintenance payments made pursuant to court order.

H. The word "minor" shall mean a person who has not attained the age of eighteen years; and the words "emancipated minor" shall mean a minor whose parents have entirely surrendered the right to the care, custody and earnings of such minor and are no longer under any legal obligation to support or maintain such minor.

I. The word "parent" shall mean a person's natural or adoptive father or mother; or if one person has custody of the child, the parent having custody; or if there is a guardian or other legal custodian of such person, then such guardian or legal custodian; provided, however, that where circumstances indicate that such guardianship or custodianship was created primarily for the purpose of conferring South Carolina domicile for tuition and fee purposes on such child or dependent person, it shall not be given such effect.

J. The word "spouse" shall mean the husband or wife of a married person.

59-112-20—South Carolina Domicile Defined for Purposes of Rates of Tuition and Fees. South Carolina Domicile for tuition and fee purposes shall be established as follows in determinations of rates of tuition and fees to be paid by students entering or attending State Institutions:

A. Independent persons who reside in and have been domiciled in South Carolina for a period of no less than twelve months with an intention of making a permanent home herein, and their dependents, may be considered eligible for in-state rates.

B. Independent persons who reside in and have been domiciled in South Carolina for fewer than twelve months but who have full-time employment in the State, and their dependents, may be considered eligible for in-state rates for as long as such independent person is employed on a full-time basis in the State.

C. Where an independent person meeting the provisions of Section 59-112-20 B above, is living apart from his spouse, or where such person and his spouse are separated or divorced, the spouse and dependents of such independent person shall have domiciliary status for tuition and fee purposes only under the following circumstances: (1) if the spouse requesting domiciliary status for tuition and fee purposes remains domiciled in South Carolina although living apart or separated from his or her employed spouse, (2) if the dependent requesting domiciliary status for tuition and fee purposes is under the legal custody or guardianship, as defined in Section 59-112-10I above, of an independent person who is domiciled in this State; or if such dependent is claimed as an income tax exemption by the parent not having legal custody but paying child-support, so long as either parent remains domiciled in South Carolina.

D. The residence and domicile of a dependent minor shall be presumed to be that of the parent of such dependent minor.

59-112-30—Effect of Change of Residency. When the domicile of a student or of the person upon whom a student is financially dependent changes after enrollment at a State Institution, tuition charges shall be adjusted as follows:

A. Except as provided in Section 59-112-20B above, when domicile is taken in South Carolina, a student shall not become eligible for in-state rates until the beginning of the next academic session after expiration of twelve months from date of domicile in this State.

B. When South Carolina domicile is lost, eligibility for in-state rates shall end on the last day of the academic session in which the loss occurs; however, application of this subsection shall be at the discretion of the institution involved.

C. Notwithstanding the other provisions of this section, any dependent person who has been domiciled with his family in South Carolina for a period of not less than three years immediately prior to his enrollment may enroll in a state-supported institution of higher learning at the in-state rate and may continue to be enrolled at such rate even if the parent, spouse, or guardian upon whom he is dependent moves his domicile from this State.

59-112-40—Effect of Marriage. Except as provided in Section 59-112-20 above, marriage shall affect determinations of domicile for tuition and fee purposes only insofar as it operates to evince an intention by the parties to make a permanent home in South Carolina.

59-112-50—Military Personnel and Their Dependents. Notwithstanding other provisions of this act, during the period of their assignment to duty in South Carolina members of the armed services of the United States stationed in South Carolina and their dependents may be considered eligible for in-state rates. When such armed service personnel are ordered away from the State, their dependents may continue for an additional twelve months to have this eligibility at the State Institutions where they are enrolled at the time such assignment ends. Such persons and their dependents may be considered eligible for in-state rates for a period of twelve months after their discharge from the armed services even though they were not enrolled at a State Institution at the time of their discharge, if they have evinced an intent to establish domicile in South Carolina and if they have resided in South Carolina for a period of at least twelve months immediately preceding their discharge.

59-112-60—Faculty, Administrative Employees and Dependents Thereof. Full-time faculty and administrative employees of State Institutions, and the spouses and children of such persons, shall be excluded from the provision of this act.

59-112-70—Abatement of Rates for Nonresidents on Scholarship. Notwithstanding other provisions of this act, the governing boards listed in Section 59-112-10A above, are authorized to adopt policies for the abatement of any part or all of the out-of-state rates for students who are recipients of scholarship aid.

59-112-80—Administration of Chapter; Burden of Proving Eligibility of Students. Each State Institution shall designate an official to administer the provisions of this act. Students making application to pay tuition and fees at in-state rates shall have the burden of proving to the satisfaction of the aforesaid officials of State Institutions that they have fulfilled the requirements of this act before they shall be permitted to pay tuition and fees at such rate.

59-112-90—Penalties for Willful Misrepresentation. Where it appears to the satisfaction of officials charged with administration of these provisions that a person has gained domiciliary status improperly by making or presenting willful misrepresentations of fact, such persons should be charged tuition and fees past due and unpaid at the out-of-state rate, plus interest at a rate of eight percent per annum, plus a penalty amounting to twenty-five percent of the out-of-state rate for one semester, and until these charges have been paid no such student shall be allowed to receive transcripts or graduate from any State Institution.

59-112-100—Regulations. The Commission on Higher Education may prescribe uniform regulations for application of the provisions of this act and may provide for annual review of such regulations.

ARTICLE V

Determination of Rates of Tuition and Fees

(Statutory Authority: 1976 Code Sections 59-112.10 to 59-112.100)

62-600—Rates of Tuition and Fees.

A. Resident classification is an essential part of fee determination, admission regulations, scholarship eligibility, and other relevant policies of the state. It is important that such institutions have fair and equitable regulations which can be administered consistently and are sensitive to the interests of both students and the State. The Commission on Higher Education hereby establishes regulations for the Statute Governing Residence and Tuition for Fee Purposes to be applied consistently by all South Carolina institutions of higher education. These regulations do not address residency matters relating to in-county categories used within the State's technical colleges.

B. Institutions of higher education are required by the Statute to determine the residence classification of applicants. The initial determination of one's resident status is made at the time of admission. The determination made at that time, and any determination made thereafter prevails for each subsequent semester until information becomes available that would impact the existing residency status and the determination is successfully challenged. The burden of proof rests with the student to show evidence as deemed necessary to establish and maintain their residency status.

62-601—Code of Laws Governing Residence. [SC ADC 62-601]

Rules regarding the establishment of legal residence for tuition and fee purposes for institutions of higher education are governed by Title 59, Chapter 112 of the 1976 South Carolina Code of Laws, as amended.

62-602—Definitions. [SC ADC 62-602]

A. "Academic Session" is defined as a term or semester of enrollment. (62-607.B)

B. "Continue to be Enrolled" is defined as continuous enrollment without an interruption that would require the student to pursue a formal process of readmission to that institution. Formal petitions or applications for change of degree level shall be considered readmissions. (62-607.A)

C. "Dependent Person" is defined as one whose predominant source of income or support is from payments from a parent, spouse, or guardian and who qualifies as a dependent or exemption on the federal income tax return of the parent, spouse, or guardian. A dependent person is also one for whom payments are made, under court order, for child support and the cost of the dependent person's college education. A dependent person's residency is based upon the residency of the person upon whom they are dependent. (62-602.G) (62-602.N) (62-603.B) (62-605.C) (62-607.A)

D. "Domicile" is defined as the true, fixed, principal residence and place of habitation. It shall indicate the place where a person intends to remain,

or to where one expects to return upon leaving with out establishing a new domicile in another state. For purposes of this section, one may have only one legal domicile. One is presumed to abandon automatically an old domicile upon establishing a new one. Housing provided on an academic session basis for student at institutions shall be presumed not to be a place of principal residence, as residency in such housing is by its nature temporary. (62-602.E) (62-602.K) (62-602.M) (62-602.N) (62-603.A) (62-603.B) (62-605.B) (62-605.C) (62-607.A) (62-607.B) (62-608.A) (62-608.C) (62-608.I) (62-609.A.3) (62-609.A.4)

E. "Family's Domicile in this State is Terminated" is defined as an employer-directed transfer of the person upon whom the student is dependent and is not construed to mean a voluntary change in domicile. (62-607.A)

F. "Full-time employment" is defined as employment that consists of at least thirty-seven and one-half hours a week on a single job in a full-time status. However, a person who works less than thirty-seven and one-half hours a week but receives or is entitled to receive full-time employee benefits shall be considered to be employed full-time if such status is verified by the employer. A person who meets the eligibility requirements of the Americans with Disabilities Act must satisfy their prescribed employment specifications in order to qualify as having full-time employment. (62-605.C.1) (62-609.A.2) (62-609.A.3)

G. "Guardian" is defined as one legally responsible for the care and management of the person or property of a minor child or one qualified to claim a dependent person based upon the five tests for dependency prescribed by the Internal Revenue Service; provided, however, that where circumstances indicate that such guardianship or custodianship was created primarily for the purpose of conferring South Carolina domicile for tuition and fee purposes on such child or dependent person, it shall not be given such effect. (62-602.C) (62-602.E) (62-602.I) (62-602.M) (62-603.B) (62-605.C)

H. "Immediately Prior" is defined as the period of time between the offer of admission and the first day of class of the term for which the offer was made, not to exceed one calendar year. (62-607.A)

I. "Independent Person" is defined as one in his/her majority (eighteen years of age or older) or an emancipated minor, whose predominant source of income is his/her own earnings or income from employment, investments, or payments from trusts, grants, scholarships, commercial loans, or payments made in accordance with court order. An independent person must provide more than half of his or her support during the twelve months immediately prior to the date that classes begin for the semester for which resident status is requested. An independent person cannot be claimed as a dependent or exemption on the federal tax return of his or her parent, spouse, or guardian for the year in which resident status is requested. (62-602.N) (62-603.A) (62-605.C) (62-607.B) (62-608.B)

J. "Minor" is defined as a person who has not attained the age of eighteen years. An "emancipated minor" shall mean a minor whose parents have entirely surrendered the right to the care, custody and earnings of such minor and are no longer under any legal obligation to support or maintain such minor. (62-602.G)

K. "Non-Resident Alien" is defined as a person who is not a citizen or permanent resident of the United States. By virtue of their non-resident status "non-resident aliens" generally do not have the capacity to establish domicile in South Carolina. (62-602.M) (62-604.A)

L. "Parent" is defined as the father, mother, stepfather, stepmother, foster parent or parent of a legally adopted child. (62-602.C) (62-602.E) (62-602.I) (62-602.J) (62-602.M) (62-603.B) (62-603.C) (62-605.C)

M. "Reside" is defined as continuous and permanent physical presence within the State, provided that absences for short periods of time shall not affect the establishment of residence. Excluded are absences associated with requirements to complete a degree, absences for military training service, and like absences, provided South Carolina domicile is maintained. (62-603.A) (62-606.B) (62-609.A) (62-609.A.3) (62-609.A.4) (62-609.B)

N. "Resident" for tuition and fee purposes is defined as an independent person who has abandoned all prior domiciles and has been domiciled in South Carolina continuously for at least twelve months immediately preceding the first day of class of the term for which resident classification is sought and for whom there is an absence of domiciliary evidence in other states or countries, not withstanding other provisions of the Statute. (62-600.A) (62-600.B) (62-602.I) (62-602.K) (62-602.M) (62-603.A) (62-603.B) (62-603.C) (62-604.A) (62-605.A) (62-605.C) (62-605.C.7) (62-606.A) (62-606.A.5) (62-606.B) (62-607.A) (62-608.B) (62-609.A.3) (62-610.A) (62-610.B) (62-611.A) (62-611.B)

O. "Spouse" is defined as the husband or wife of a married person in accordance with Title 20, Chapter 1 of the 1976 South Carolina Code of Laws, as amended. (62-602.C) (62-602.E) (62-602.I) (62-602.M) (62-603.B) (62-605.C)

P. "Temporary Absence" is defined as a break in enrollment during a fall or spring semester (or its equivalent) during which a student is not registered for class. (62-606.A)

Q. "Terminal Leave" is defined as a transition period following active employment and immediately preceding retirement (with a pension or annuity), during which the individual may use accumulated leave. (62-609.A.4)

R. "United States Armed Forces" is defined as the United States Air Force, Army, Marine Corps, Navy, and Coast Guard. (62-606.B) (62-609.A.11)

62-603—Citizens and Permanent Residents. [SC ADC 62-603]

A. Independent persons who have physically resided and been domiciled in South Carolina for twelve continuous months immediately preceding the date the classes begin for the semester for which resident status is claimed may qualify to pay in-state tuition and fees. The twelve-month residency period starts when the independent person establishes the intent to become a South Carolina resident per section 62-605 entitled "Establishing the Requisite Intent to Become a South Carolina Domiciliary." Absences from the State during the twelve-month period may affect the establishment of permanent residence for tuition and fee purposes.

B. The resident status of a dependent person is based on the resident status of the person who provides more than half of the dependent person's sup-

port and claims or qualifies to claim the dependent person as a dependent for federal income tax purposes. Thus, the residence and domicile of a dependent person shall be presumed to be that of their parent, spouse, or guardian.

C. In the case of divorced or separated parents, the resident status of the dependent person may be based on the resident status of the parent who claims the dependent person as a dependent for tax purposes; or based on the resident status of the parent who has legal custody or legal joint custody of the dependent person; or based on the resident status of the person who makes payments under a court order for child support and at least the cost of his/her college tuition and fees.

62-604—Non-Resident Aliens, Non-Citizens, and Non-Permanent Residents. [SC ADC 62-604]

A. Except as otherwise specified in this section or as provided in section 62-609 (1) and (2), independent non-citizens and non-permanent residents of the United States will be assessed tuition and fees at the non-resident, out-of-state rate. Independent non-resident aliens, including refugees, asylees, and parolees may be entitled to resident, in-state classification once they have been awarded permanent resident status by the U.S. Department of Justice and meet all the statutory residency requirements provided that all other domiciliary requirements are met. Time spent living in South Carolina immediately prior to the awarding of permanent resident status does not count toward the twelve month residency period. Certain non-resident aliens present in the United States in specified visa classification are eligible to receive in-state residency status for tuition and fee purposes as prescribed by the Commission on Higher Education. They are not, however, eligible to receive state sponsored tuition assistance/scholarships.

B. Title 8 of the Code of Federal Regulations (CFR) serves as the primary resource for defining visa categories.

62-605—Establishing the Requisite Intent to Become a South Carolina Domiciliary. [SC ADC 62-605]

A. Resident status may not be acquired by an applicant or student while residing in South Carolina for the sole purpose of enrollment in an institution or for access to state-supported programs designed to serve South Carolina residents.

B. If a person asserts that his/her domicile has been established in this State, the individual has the burden of proof. Such persons should provide to the designated residency official of the institution to which they are applying any and all evidence the person believes satisfies the burden of proof. The residency official will consider any and all evidence provided concerning such claim of domicile, but will not necessarily regard any single item of evidence as conclusive evidence that domicile has been established.

C. For independent persons or the parent, spouse, or guardian of dependent persons, examples of intent to become a South Carolina resident may include, although any single indicator may not be conclusive, the following indicia:

- (1) Statement of full-time employment;
- (2) Possession of a valid South Carolina voter registration card;

(3) Designating South Carolina as state of legal residence on military record;

(4) Possession of a valid South Carolina driver's license, or if a non-driver, a South Carolina identification card. Failure to obtain this within 90 days of the establishment of the intent to become a South Carolina resident will delay the beginning date of residency eligibility.

(5) Possession of a valid South Carolina vehicle registration card. Failure to obtain this within 45 days of the establishment of the intent to become a South Carolina resident will delay the beginning date of residency eligibility.

(6) Maintenance of domicile in South Carolina;

(7) Paying South Carolina income taxes as a resident during the past tax year, including income earned outside of South Carolina from the date South Carolina domicile was claimed;

(8) Ownership of principal residence in South Carolina; and

(9) Licensing for professional practice (if applicable) in South Carolina.

D. The absence of indicia in other states or countries is required before the student is eligible to pay in-state rates.

62-606—Maintaining Residence. [SC ADC 62-606]

A. A person's temporary absence from the State does not necessarily constitute loss of South Carolina residence unless the person has acted inconsistently with the claim of continued South Carolina residence during the person's absence from the State. The burden is on the person to show retention of South Carolina residence during the person's absence from the State. Steps a person should take to retain South Carolina resident status for tuition and fee purposes include:

- (1) Continuing to use a South Carolina permanent address on all records;
- (2) Retaining South Carolina voter's status;
- (3) Maintaining South Carolina driver's license;
- (4) Maintaining South Carolina vehicle registration;
- (5) Satisfying South Carolina resident income tax obligation. Individuals claiming permanent residence in South Carolina are liable for payment of income taxes on their total income from the date they established South Carolina residence. This includes income earned in another state or country.

B. Active duty members of the United States Armed Forces and their dependents are eligible to pay in-state tuition and fees as long as they continuously claim South Carolina as their state of legal residence during their military service. Documentation will be required in all cases to support this claim. South Carolina residents who change their state of legal residence while in the military lose their South Carolina resident status for tuition and fee purposes.

62-607—Effect of Change of Residency. [SC ADC 62-607]

A. Notwithstanding other provisions of this section, any dependent person of a legal resident of this state who has been domiciled with his/her family in South Carolina for a period of not less than three years and whose family's domicile in this state is terminated immediately prior to his/her enrollment may

enroll at the in-state rate. A student must continue to be enrolled and registered for classes (excluding summers) in order to maintain eligibility to pay in-state rates in subsequent semesters. Transfers within or between South Carolina colleges and universities of a student seeking a certificate, diploma, associate, baccalaureate, or graduate level degree does not constitute a break in enrollment.

B. If a dependent or independent person has been domiciled in South Carolina for less than three years, eligibility for in-state rates shall end on the last day of the academic session during which domicile is lost. Application of this provision shall be at the discretion of the institution involved. However, a student must continue to be enrolled and registered for classes (excluding summers) in order to maintain eligibility to pay in-state rates in subsequent semesters.

62-608—Effect of Marriage. [SC ADC 62-608]

A. In ascertaining domicile of a married person, irrespective of gender, such a review shall be determined just as for an unmarried person by reference to all relevant evidence of domiciliary intent.

B. If a non-resident marries a South Carolina resident, the non-resident does not automatically acquire South Carolina resident status. The non-resident may acquire South Carolina resident status if the South Carolina resident is an independent person and the non-resident is a dependent of the South Carolina resident.

C. Marriage to a person domiciled outside South Carolina shall not be solely the reason for precluding a person from establishing or maintaining domicile in South Carolina and subsequently becoming eligible or continuing to be eligible for residency.

D. No person shall be deemed solely by reason of marriage to a person domiciled in South Carolina to have established or maintained domicile in South Carolina and consequently to be eligible for or to retain eligibility for South Carolina residency.

62-609—Exceptions. [SC ADC 62-609]

A. Persons in the following categories qualify to pay in-state tuition and fees without having to establish a permanent home in the state for twelve months. Persons who qualify under any of these categories must meet the conditions of the specific category on or before the first day of class of the term for which payment of in-state tuition and fees is requested.

(1) "Military Personnel and their Dependents": Members of the United States Armed Forces who are permanently assigned in South Carolina on active duty and their dependents are eligible to pay in-state tuition and fees. When such personnel are transferred from the State, their dependents may continue to pay in-state tuition and fees for an additional twelve months. Such persons (and their dependents) may also be eligible to pay in-state tuition and fees for a period of twelve months after their discharge from the military, provided they have demonstrated an intent to establish a permanent home in South Carolina and they have resided in South Carolina for a period of at least twelve months immediately preceding their discharge. Military personnel who are not stationed in South Carolina and/or former military personnel who intend to establish South Carolina residency must fulfill the twelve month "physical pres-

ence" requirement for them or their dependents to qualify to pay in-state tuition and fees.

(2) "Faculty and Administrative Employees with Full-Time Employment and their Dependents": Full-time faculty and administrative employees of South Carolina state-supported colleges and universities and their dependents are eligible to pay in-state tuition and fees.

(3) "Residents with Full-Time Employment and their Dependents": Persons who reside, are domiciled, and are full-time employed in the State and who continue to work full-time until they meet the twelve-month requirement and their dependents are eligible to pay in-state tuition and fees, provided that they have taken steps to establish a permanent home in the State. Steps an independent person must take to establish residency in South Carolina are listed in section 62-605 entitled ("Establishing the Requisite Intent to Become a South Carolina Domiciliary").

(4) "Retired Persons and their Dependents": Retired persons who are receiving a pension or annuity who reside in South Carolina and have been domiciled in South Carolina as prescribed in the Statute for less than a year may be eligible for in-state rates if they maintain residence and domicile in this State. Persons on terminal leave who have established residency in South Carolina may be eligible for in-state rates even if domiciled in the State for less than one year if they present documentary evidence from their employer showing they are on terminal leave. The evidence should show beginning and ending dates for the terminal leave period and that the person will receive a pension or annuity when he/she retires.

B. South Carolina residents who wish to participate in the Contract for Services Program sponsored by the Southern Regional Education Board must have continuously resided in the State for other than educational purposes for at least two years immediately preceding application for consideration and must meet all residency requirements during this two-year period.

62-610—Application for Change of Resident Status. [SC ADC 62-610]

A. Persons applying for a change of resident classification must complete a residency application/petition and provide supporting documentation prior to a reclassification deadline as established by the institution.

B. The burden of proof rests with those persons applying for a change of resident classification who must show required evidence to document the change in resident status.

62-611—Incorrect Classification. [SC ADC 62-611]

A. Persons incorrectly classified as residents are subject to reclassification and to payment of all non-resident tuition and fees not paid. If incorrect classification results from false or concealed facts, such persons may be charged tuition and fees past due and unpaid at the out-of-state rate. The violator may also be subject to administrative, civil, and financial penalties. Until these charges are paid, such persons will not be allowed to receive transcripts or graduate from a South Carolina institution.

B. Residents whose resident status changes are responsible for notifying the Residency Official of the institution attended of such changes.

62-612—Inquiries and Appeals. [SC ADC 62-612]

A. Inquiries regarding residency requirements and determinations should be directed to the institutional residency official.

B. Each institution will develop an appeals process to accommodate persons wishing to appeal residency determinations made by the institution's residency official. Neither the primary residency official nor appellate official(s) may waive the provisions of the Statute or regulation governing residency for tuition and fee purposes.

Appeals should be sent to the Student Financial Aid Office, G-01 Sikes Hall.

DINING SERVICES

The University provides a variety of meal plans to meet student needs. The meal plan dining halls, Harcombe and Schillerter, are on opposite sides of the campus and feature an unlimited seconds policy on most entrees. Students may use their meal card for pre-designated meals at the Clemson House.

Meals may also be purchased on a cash basis or using a Tiger Stripe account. Meal plans become effective when University housing is opened for occupancy at the beginning of each semester and expire after the evening meal on the day of graduation at the end of each semester. Meal plans are not effective during official University breaks.

The Eastside Food Court, the Canteen, Java City Cyber Café, and Fernow Street Café provide a wide assortment of dining selections on an a la carte, cash basis. Nationally branded food concepts are available in cash dining facilities on campus. Burger King and Li'l Dino Subs can be found in the Eastside Food Court; Chick-fil-A is located at the Union Canteen; and Piza Hut Express is available in the Fernow Street Café. All dining services facilities accept cash or the Tiger 1 Card.

All first-year freshmen who live in University housing, excluding apartments with kitchens, are required to subscribe to one of the following meal plans for their first two semesters: Any Ten, Plus Any Ten, Any 15, Plus Any 15, or Unlimited Access. All other students may choose a meal plan on a semester basis or pay for individual meals. First-year freshmen living in University housing (excluding the aforementioned housing) may terminate their meal plan for one of the following reasons:

- withdrawal from the University.
- change in housing assignment to an apartment with kitchen facilities.
- medical condition with dietary requirements that cannot be met by Dining Services. Documentation from a medical doctor must be provided along with specific dietary requirements. This documentation will be reviewed by the Dining Services Food Service Administrator.
- other circumstances determined by the University to be beyond the student's control.

Freshmen students must provide the necessary documentation for any of the above reasons before cancellation of their meal plan will be considered. Upperclassmen may terminate their meal plan for any reason. Failure to participate in a meal plan does not automatically release a student from the freshman requirement to subscribe to a meal plan.

Students may change meal plans at the Tiger 1 Card Office, located in 304 Fike Recreation Center, on Mondays only. Students may change meal plans at the billing of spring and fall semester fees with no service charge or after the first two weeks and prior to the last six weeks of the semester by paying a \$35 service charge. All adjustments will be prorated, except for students withdrawing from the University. Students may upgrade meal plans during the registration period.

Meal plans cancelled for any reason after service of the first meal will result in a refund of advance payment, minus a \$35 termination charge, and a weekly charge for meals available. The meals available charge applies to the meals that have been served, not those that have been eaten by the individual student. The Paw Points which are associated with the Plus plans are not refundable; however, they do carry forward to the next semester. No changes, meal plan cancellations, or refunds will be made during the last six weeks of a semester. Requests for refunds may be made at the Tiger 1 Card Office. Students will be responsible for all service charges related to changes or termination of a meal plan.

TIGER STRIPE ACCOUNT

The Tiger Stripe account is equivalent to a prepaid debit card. Under the Tiger Stripe account program, funds are deposited into the account along with payment of fees through TigerLine (864-656-8447). As items are purchased from over 200 locations that accept Tiger Stripe, the amount spent is deducted from the Tiger Stripe account balance. All students are eligible. Additional funds may be added to the account via the Tiger 1 Card Office on the Web at www.tiger1.clemson.edu. Students may also pay in person at the Tiger 1 Card Office with cash, check, or credit card; or they may call 864-656-0763 to pay with Visa, MasterCard, or Discover. Office hours are Monday–Friday, 8:00 A.M.–4:30 P.M.

Tiger Stripe accounts are non-refundable except for students withdrawing, graduating, or not returning to the University. Tiger Stripe cannot be used for the payment of tuition. Transactions are limited to \$250 per day in the University Revenue and Receivables Office for the payment of incidental fees. Credit balances at the end of each semester will carry forward to the next term. (Students withdrawing must go to E-108 Martin Hall. Balances greater than \$5 will be refunded.) Any indebtedness to the University will be deducted from refunds. All graduating students will be required to request a refund at the Tiger 1 Card Office two weeks prior to graduation. Any account that remains dormant for 18 months or longer will have the balance transferred to a University scholarship account. For more information, call 864-656-0763 or e-mail tiger1-1@clemson.edu.

Additional information is available on the Web at www.tiger1.clemson.edu.

FINANCIAL AID

The Office of Student Financial Aid administers and coordinates various types of undergraduate financial aid administered by Clemson University: scholarships, loans, grants, and work-study employment. The office works jointly with the Financial Aid and Placement Committee and the University Scholarships and Awards Committee.

Students may apply after January 1 for financial assistance for the next academic year. Financial aid requests, based on financial need, must be supported by a processed Free Application for Federal Student Aid (FAFSA) and renewed annually. No application is required for the LIFE Scholarship.

The FAFSA must be submitted by February 15 for need-based scholarship consideration and by April 1 for the Federal Supplemental Educational Opportunity Grant (FSEOG), Federal Work-Study, Federal Perkins Loan, South Carolina State Need-Based Grant, and Clemson Community Service Grant. April 1 is the suggested deadline for application for the Federal Pell Grant, Federal Stafford Loan, and Federal PLUS Loan, which requires a separate application completed by a parent.

Transfer students applying for student loans will be considered as entering freshmen in determining maximum loan limits. Following enrollment, after the credit evaluation process has been completed, students may submit a request for additional funds due to changes in class standing.

Brochures detailing financial aid programs at Clemson University are available from the Student Financial Aid Office, G-01 Sikes Hall, Box 345123, Clemson, SC 29634-5123.

Satisfactory Academic Progress for Financial Aid Eligibility

Students must maintain satisfactory academic progress to be eligible for financial aid. This policy contains both qualitative (grade-point ratio) and quantitative (credit hours completed) requirements. Students must meet the grade-point ratio requirement as stated under the Continuing Enrollment Policy. Students must also complete 12, 9, or 6 hours per semester according to their enrollment (full time, $\frac{3}{4}$ time, or $\frac{1}{2}$ time) as of the last day to add a class. Students have a maximum of 12 full-time semesters in which to finish their degree, or the equivalent in part-time enrollment. Duplicate credits taken at Clemson University do not count as credits completed for satisfactory academic progress. Details are available in the publication *Financing Your Clemson University Education*. Students wishing to appeal their academic progress status may submit a letter to the Student Financial Aid Office. This appeals process is separate from the Appeals Committee on Continuing Enrollment. Students returning under the academic renewal policy who apply for financial aid should also submit a letter to the Student Financial Aid Office to update their academic progress record. Prior terms will be counted in the 12 semesters allowed for satisfactory academic progress.

Educational Benefits for Veterans, War Orphans, and Children of Deceased or Disabled Law Enforcement Officers or Fire Fighters

The Veterans Administration provides educational assistance for veterans and children of deceased or totally disabled veterans who meet requirements of applicable laws and regulations. Any veteran or child of a deceased or totally disabled veteran should communicate with the nearest Veterans Administration Office to determine whether he/she is entitled to any educational benefits. Free tuition is available to children of South Carolina law enforcement officers or fire fighters who were totally disabled or killed in the line of duty. Certification is required from the agency of the parent's employment. Upon presentation of proof of eligibility, a student shall not become eligible for educational assistance until the beginning of the academic term.

STUDENT SERVICES

HOUSING

Single Student Housing

University Housing provides a "home away from home" for approximately 6,500 single students in 21 residence halls, four apartment complexes, and the Clemson House. Most rooms are double occupancy with a limited number of single rooms available. Most two-bedroom apartments accommodate four students. All University housing is equipped to meet the needs of today's college student. Approximately two weeks after acceptance to the University, housing information will be mailed to students. A signed housing contract, room preference card, and a \$35 nonrefundable application fee should be returned to the Housing Office to reserve a space. For incoming freshmen or transfer students (who are at least 18 years old), the standard way to apply for on-campus housing is on the Web at www.housing.clemson.edu/apply. Transfer students and former students returning are offered on-campus housing if space is available.

REDFERN HEALTH CENTER

Medical Services

Redfern Health Center, an outpatient facility, operates Monday–Friday, 8:00 A.M.–5:00 P.M. (summer hours, 8:00 A.M.–4:30 P.M.). Students are seen on an appointment basis or without appointments in the Nurses Clinic. The student health center offers outpatient ambulatory care for illnesses and injury, pharmacy, lab, x-ray, and specialty clinics including women's health, allergy/immunization, and massage therapy.

A completed medical clearance form is required of all students entering the University for the first time. Documentation of two red measles (rubeola) vaccines since the student's first birthday is required. Students born before January 1, 1957, are exempt from the measles requirements. A tuberculin skin test (PPD) is required within the year prior to admission. Students with a history of a positive skin test are required to have a chest x-ray within the past year. Students not in compliance with immunization requirements will not be allowed to complete registration for the next semester.

After Hours

Emergency 911 services are available after hours. Students with questions about their health care needs should call the Nursewise Line at 1-888-525-1333. A registered nurse is available by telephone to answer questions and offer advice about health care needs.

Students requiring the care of a physician after hours choose from area emergency rooms and urgent care facilities including Clemson Health Center (an urgent care facility), Oconee Memorial Hospital, Anderson Area Medical Center, Palmetto Baptist Medical Center, and Greenville Memorial Medical Center. Medical costs incurred are the student's responsibility. Students should contact Redfern the next business day for follow-up care.

The University ambulance transports on-campus medical emergencies to the closest community medical resource. The University ambulance is staffed with licensed emergency medical personnel 24 hours a day. Students are required to pay for off-campus ambulance transportation except for those medical resources within the city of Clemson for after-hours urgent care.

Counseling and Psychological Services (CAPS)

CAPS provides mental health services for a variety of issues including stress management, depression, anxiety, eating disorders, substance abuse and addictions, relationship violence, as well as others. All services are confidential. Services and charges not covered by the health fee are discussed before services are provided. Regular appointments may be made by calling the CAPS appointment line at 656-2451.

CAPS offers a walk-in clinic from 10:00 A.M.–3:00 P.M. so that students can see a counselor as soon as possible. Students are seen on a first-come, first-served basis.

CAPS provides group, individual, and couples counseling and psychotherapy to students. Students who pay the health fee are allowed ten counseling sessions per semester at no charge. Mental health crisis assistance and consultation are available 24 hours a day by calling 656-2451 during regular hours. After hours and on weekends, the on-call counselor can be reached through the University police at 656-2222.

CAPS Lifestyle Substance Abuse Services are designed to address the special needs of students and to offer early intervention before alcohol or substance abuse becomes a life-long problem. More information is available by calling 656-2451.

Psycho-education evaluations for learning and attention difficulties are available through CAPS.

Health Education/ Alcohol and Drug Education

The Office of Health Education reaches out to the entire campus community and encourages the adoption of healthy lifestyles, general positive attitudes, and the modification of risky health behaviors. In addition, the office selects and trains student peer educators to follow healthy role models on campus, engages fellow students in peer counseling, gives presentations on health issues relevant to college students, and collects and disseminates information about current health topics to the whole community. The Health Education program covers topics such as alcohol and other drug issues, HIV/AIDS awareness and prevention, sexual health and responsibility, dating violence, healthy sleep lifestyles, nutrition, stress management, and tobacco cessation efforts, among other topics.

Financial Considerations

Health Fee—University policy requires that all students registered for seven or more credit hours on campus during the fall or spring semester or four or more on-campus credit hours during a summer session pay the University health fee. The health fee

provides access to the professional services of University physicians, nurse practitioners, counselors, and health educators at no additional cost, reduced costs for medical diagnostics; and an after-hours urgent care excess insurance benefit. Students pay for pharmaceuticals, orthopedic equipment, specialty clinics, and psychological testing. Payment is expected at the time of service and may be made by cash, check, MasterCard, Visa, or Tiger Stripe.

Health Insurance—The University offers an accident and sickness insurance plan to help cover major medical expenses. Information is available on the Web at www.studentinsurance.com. Students are strongly encouraged to have comprehensive health insurance coverage during their tenure at the University.

CAREER SERVICES

Clemson's Michelin® Career Center offers a variety of services. Students benefit from consulting with career counselors and career library resources in choosing a major, exploring careers, networking for part-time jobs, internships, or permanent positions. Assistance with applying to graduate and professional schools is also available.

The Career Center offers 0-credit-hour internships courses (CCINT) for students in majors that do not offer credit by their department. Students can participate in either a part-time internship course or a full-time internship course. The Career Center also offers career assessments for students who are undecided about major or career direction, individual résumé and cover letter critiques, mock interviews, job search assistance, job outlook, and salary information. In addition, students can utilize CareerNet, an on-line recruiting system, to view part-time jobs, internships, full-time job positions, post résumés and to sign up for on-campus interviews.

Major events sponsored by the Career Center include a fall and spring Career Fair, Graduate and Professional School Day, University Placement/Recruitment for Educators Program (UPREP) Teacher Fair, and a Majors Fair.

Information is available from the Career Center in 316 Hendrix Center, on the Web at career.clemson.edu, or by calling 656-6000.

DISABILITY SERVICES

Student Disability Services coordinates the provision of reasonable accommodations for students with physical, emotional, or learning disabilities. Accommodations are individualized, flexible, and confidential based on the nature of the disability and the academic environment in compliance with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990.

Students are encouraged to consult with the Disability Services staff early in the semester, preferably prior to the first day of class. Current documentation of a specific disability from a licensed professional is needed. For additional information or an appointment, contact Student Disability Services, G-23 Redfern Health Center at 656-6848. Details on policies and procedures are available on the Web at www.clemson.edu/asc.

ACADEMIC REGULATIONS

Academic regulations can be found on the Web at www.registrar.clemson.edu/.

Proper discharge of all duties is required at Clemson University, and a student's first duty is his/her scholastic work. All students should be thoroughly acquainted with these basic requirements.

CREDIT SYSTEM

The semester hour is the basis of all credits. Generally, one recitation hour or two–three laboratory hours a week for a semester constitute a semester hour. Thus, in ENGL 101 Composition I 3(3,0), as this subject is listed in the *Courses of Instruction* section of this catalog, the student takes three semester hours. When the course is completed satisfactorily, three credit hours are entered on the student's record. The notation "3(3,0)" means that the course carries three credits, has three clock hours of theory or recitation per week, and no laboratory hours. CH 101 General Chemistry 4(3,3) carries four semester hours, has three hours of theory and a three-hour laboratory period.

Credit Load

Except for an entering freshman who is restricted to the curriculum requirements of his/her major, the credit load for an undergraduate must be approved by the class advisor. The class advisor will approve a credit load deemed in the best interest of the student based on such factors as course requirements, grade-point ratio, participation in other activities, and expected date of graduation.

For fall and spring semesters, the maximum number of hours in which a student may enroll is 21, and 15 hours is the maximum credit load for those on probation. Permission of the student's academic advisor is required for all registration in more than 21 hours, or 15 hours for those on probation. Enrollment in summer is limited to three credit hours in Maymester, seven credit hours in first summer session, and seven credit hours in second summer session. Enrollment in additional credit hours must be approved by the student's academic advisor.

Students are not permitted to enroll in courses with overlapping class times.

Full-time Enrollment

In fall and spring semesters, enrollment in 12 or more credit hours is considered full time. Combined enrollment in 12 or more hours in Maymester and first and second summer terms is considered full time for the summer. Enrollment in fewer than 12 credit hours is part time.

Advanced Placement and Credit by Examination

In addition to earning credit by the usual method involving classroom attendance, a student may receive credit toward his/her degree by completing a course successfully by examination only. Freshmen

interested in exempting some elementary courses in this manner should participate in the College Board Advanced Placement Examination program and have the results of these tests sent to Clemson.

Certain departments will also grant credit for successful completion of College-Level Examination Program (CLEP) subject examinations which are administered by the College Board.

Enrolled students may earn credit by means of a special examination without the necessity of class attendance subject to the following requirements:

1. The applicant must present evidence that he/she has received training or taken work which is approximately equivalent to that given in the course at Clemson for which an examination is requested.
2. The applicant must not have previously failed or audited the course at Clemson.
3. The applicant must apply in writing for the examination; the request must be approved by the instructor, chair of the department in which the course is taught, and the Enrolled Student Services Office. Application forms are available in the Enrolled Student Services Office, 104 Sikes Hall.

Credit (CR) will be awarded for acceptable work in lieu of letter grades in recognition of college-level achievement as determined by College Board Advanced Placement Examination, International Baccalaureate Program, College-Level Examination Program subject examination, institutional special examinations, and similar instruments.

Transfer Credit

For Clemson students, coursework completed with a grade of C or better at other regionally accredited institutions, including correspondence courses, telecourses, and appropriate exemption credit, will be evaluated for transfer in terms of equivalent courses included in the Clemson curriculum of the student's choice. This does not guarantee that all courses taken at other institutions will be accepted for transfer. The acceptability of each course or exemption will be based on an evaluation by the faculty concerned. Coursework earned at different institutions will not be joined to equate with one Clemson course. No course taken at a nonbaccalaureate-degree granting institution may be used as an equivalent or substitute for any 300- or 400-level Clemson course. (Note: Only grades graded at Clemson are used in computing the student's grade-point ratio.)

Learning experiences including, but not limited to, military service schools, non-collegiate sponsored instruction, work related experiences, etc. will not be evaluated for transfer; however, enrolled students may request credit by examination for any non-transferable learning experience. For additional information, see *Advanced Placement and Credit by Examination* above.

Approval of each course should be obtained by the student prior to scheduling the class. By obtaining advance approval, the student is assured of receiving proper credit at Clemson upon satisfactory completion of the course. Information and forms relative to this approval may be obtained in the Enrolled Student Services Office, 104 Sikes Hall.

Learning Experiences

All "for credit" learning experiences conducted with organizations other than accredited higher education institutions must be regularly supervised by appropriate members of the Clemson University faculty or staff. The student must be enrolled at the time the credit is generated, and the level of credit (grade) is the responsibility of the faculty member(s) in the discipline from which the grade comes.

External Education Experiences

In all "for credit" external educational programs which Clemson University may have with professional, vocational, technical, clinical, and foreign study, the agreements are to be agreed to through signature of the Provost and the President. In such cases, learning experiences for which credit is awarded must be under the ultimate control and supervision of Clemson University.

GRADING SYSTEM

The grading system is as follows:

A—Excellent Indicates work of a very high character, the highest grade given.

B—Good Indicates work that is definitely above average, though not of the highest quality.

C—Fair Indicates work of average or medium character.

D—Pass Indicates work below average and unsatisfactory, the lowest passing grade.

F—Failed Indicates that the student knows so little of the subject that it must be repeated in order that credit may be received.

I—Incomplete Indicates that a relatively small part of the semester's work remains undone. Grade I is not given a student who made a grade F on his/her daily work. Students are allowed thirty days after the beginning of the next scheduled session, excluding summers and regardless of the student's enrollment status, to remove the incomplete grade. Normally, only one extension for each I may be granted, and this under unusual circumstances. The extension must be approved in writing by the instructor of the course and the chair of the department in which the course was taken. The extension will indicate the nature and amount of work to be completed and the time limit. (Students under this policy are prohibited from removing the I by repeating the course.) A letter grade of I converts to F unless the incomplete is removed within the time specified.

W—Withdraw Indicates that the student withdrew from the course or was withdrawn by the instructor after the first two weeks of classwork and prior to the last seven weeks of classes, not including the examination period. Proportionate time periods apply during summer and other shortened sessions. Each undergraduate student is allowed to withdraw or be withdrawn with a grade of W from no more than 17 hours of coursework during the entire academic career at Clemson University. Transfer students may withdraw from no more than 12 percent of the total work remaining to be done in the chosen undergraduate curriculum at the time of transfer to Clemson University up to a total of 17 hours

of coursework, whichever is fewer. Partial credit for courses cannot be dropped. A student who exceeds these limits of hours or who is enrolled during any part of the last seven weeks of classes shall have final grades recorded. A student may withdraw from the University subject to the restrictions above. Additionally, pending approval from the provost or the provost's designee, students may withdraw from Clemson University one time only during their academic careers prior to the final seven weeks of classes (proportionate time periods apply during summer and other shortened sessions), without reduction from their allotted W hours. Any variance from these restrictions must be approved by the provost or the provost's designee and must be requested within 90 calendar days (exclusive of summer vacation) of the date of the last exam for the term. The student must document the circumstances supporting the request. For financial aid purposes, enrollment is defined and satisfactory academic progress levels are established as of the last day to register or add classes. Withdrawal can negatively impact financial aid eligibility if a student does not complete a sufficient number of hours. Details are available in the publication *Financing Your Clemson University Education*.

Grade-Point Ratio

In calculating a student's grade-point ratio, the total number of grade points accumulated by the student is divided by the total number of credit hours attempted at Clemson during the semester, session, or other period for which the grade-point ratio is calculated. For each credit hour, the student receives grade points as follows: A-4, B-3, C-2, D-1. No grade points are assigned for grades F, I, P, or W.

Pass/Fail Option

Juniors or Seniors enrolled in four-year curricula may take four courses (maximum of 15 credit hours), with not more than two courses in a given semester on a Pass/Fail basis. Transfer and five-year program students may take Pass/Fail courses on a pro rata basis. Only courses to be used as electives may be taken optionally as Pass/Fail.

Letter-graded courses which have been failed may not be repeated Pass/Fail.

Registration in Pass/Fail courses will be handled in the same manner as for regular enrollment. Departmental approval must be obtained via approval form and returned to the Registrar's Office in accordance with the University calendar for adding courses. Instructors will submit letter grades to the Registration Services Office. These grades will be converted as follows: A, B, C to P (pass); D, F to F (fail). Only P (minimum letter grade of C) or F will be shown on a student's permanent record and will not affect the grade-point ratio.

If a student changes to a major which requires a previously passed course, and this course has been taken Pass/Fail, he/she may request either to take the course on a letter-graded basis, the P be changed to C, or substitution of another course.

In the event limited enrollment in a class is necessary, priority will be given as follows: majors, letter-graded students, Pass/Fail students, and auditors.

Dropping Classwork

A subject dropped after the first two weeks of classwork and prior to the last seven weeks during the fall and spring semesters is recorded as W—Withdraw. Proportionate time periods apply during summer sessions.

Mid-term Grades

Once, near mid-term, but no later than two days before the last day students can drop courses without receiving a final grade, instructors of every undergraduate course shall make available for each student (a) that student's ranking to-date in that course or (b) that student's course grade to-date, relative to the grading system stated in the course syllabus. More frequent feedback is strongly encouraged.

Both student and instructor are to recognize that this feedback reflects the student's performance up to that point in time, and as such, that student's final course grade may change based upon subsequent coursework performance(s).

The policy includes all undergraduate courses and applies to all terms, including Maymester and summer sessions.

Final Examinations

The standing of a student in his/her work at the end of a semester is based upon daily classwork, tests or other work, and the final examinations. Faculty members may excuse from the final examinations all students having the grade of A on the coursework prior to the final examination. For all other students, written examinations are required in all subjects at the end of each semester, except in certain laboratory or practical courses in which final examinations are not deemed necessary by the department faculty.

Final examinations must be given on the dates and at the times designated in the final examination schedule.

Grade Reports

Students may use the Internet, telephone, or the campus computer network to access their end-of-term grades. Final grade reports are mailed to undergraduate students on academic probation and to other students upon request. Request forms are available in the Offices of Enrolled Student Services and Registration Services.

Continuing Enrollment Policy

At the end of any enrollment period, a notice of academic probation shall be placed on the grade report of an undergraduate student if his/her cumulative grade-point ratio is below 2.0, which is the minimum necessary for graduation.

In the event that a student is placed on academic probation, notification to that effect will be placed on the grade report for that session in which the student's academic deficiency occurred and for each session the student remains on probation. The student who clears probation by returning to the graduating academic requirement (2.0) will have notice to that effect placed on the grade report for that session. No notation concerning probation is placed on the student's permanent record.

A student on academic probation will be subject to suspension or dismissal at the end of the spring semester if his/her cumulative grade-point ratio is below the minimum cumulative grade-point ratio (MCGPR). Students entering Clemson University for the first time will not be subject to suspension or dismissal until they have attempted coursework at Clemson for two semesters, fall or spring, (not necessarily consecutive enrollment). The MCGPR is 2.0 for students with credit levels (CL) greater than or equal to 95 hours. For students with credit levels less than 95 hours, the MCGPR is given in the table below. CL in the table is the student's credit level, based on all credits taken at Clemson, plus any advanced standing received from transfer credits and credits based on approved examination programs.

CL	MCGPR	CL	MCGPR	CL	MCGPR	CL	MCGPR
16	1.28	36	1.68	56	1.85	76	1.94
17	1.31	37	1.69	57	1.85	77	1.94
18	1.35	38	1.70	58	1.86	78	1.94
19	1.37	39	1.72	59	1.86	79	1.95
20	1.40	40	1.73	60	1.87	80	1.95
21	1.43	41	1.74	61	1.88	81	1.95
22	1.45	42	1.75	62	1.88	82	1.96
23	1.47	43	1.75	63	1.89	83	1.96
24	1.50	44	1.76	64	1.89	84	1.96
25	1.52	45	1.77	65	1.89	85	1.97
26	1.53	46	1.78	66	1.90	86	1.97
27	1.55	47	1.79	67	1.90	87	1.97
28	1.57	48	1.79	68	1.91	88	1.97
29	1.59	49	1.80	69	1.91	89	1.98
30	1.60	50	1.81	70	1.92	90	1.98
31	1.62	51	1.82	71	1.92	91	1.98
32	1.63	52	1.82	72	1.92	92	1.99
33	1.64	53	1.83	73	1.93	93	1.99
34	1.66	54	1.84	74	1.93	94	1.99
35	1.67	55	1.84	75	1.93	95+	2.00

The values in this table are based on the following formula: $MCGPR = 2.25 \times (CL / (CL + 12))$

Students have several options to avoid suspension or dismissal after the spring semester. One option is to pass at least 12 semester credit hours and earn a 2.2 or higher semester grade-point ratio in the spring semester. Another option is to enroll in summer school and have regular enrollment reinstated immediately if the summer school work brings the cumulative grade-point ratio above the MCGPR or if the student passes a maximum of 12 semester credit hours and earns a 2.2 or higher grade-point ratio during Maymester, first, and/or second summer sessions. The final option to avoid suspension or dismissal is to appeal to the Appeals Committee on Continuing Enrollment at the end of the spring term or second summer session. This committee meets approximately one week after final examinations in the fall, spring, and second summer session. Students should contact the Office of Undergraduate Academic Services for a schedule of meeting dates. Appeals must be in the Office of Undergraduate Academic Services no later than three days prior to the Appeals Committee meeting. An appeal must include a letter from the student giving a complete explanation of his/her poor academic performance. To the extent possible, verifiable documentation should also be included. Students are strongly encouraged to submit a letter directly to the chair of the Appeals Committee on Continuing Enrollment from the appropriate department chair (or designee) or academic advisor stating support of the student for continued enrollment in that department. Appeals will be granted only in the most exceptional cases, and a student will be allowed to continue on an appeal only once prior to dismissal. Students who return on a successful appeal must meet the conditions specified by the Appeals Committee on Continuing Enrollment.

When a student is suspended or dismissed for academic reasons, ineligibility to continue officially commences on the first day of classes of the very next semester (fall or spring, as appropriate) immediately following the decision of ineligibility. Suspension is for one semester only and the student is guaranteed readmission the following term.

A student who has been dismissed may file a petition for readmission with the Appeals Committee on Continuing Enrollment after one calendar year. If this petition is denied, the student may file subsequent petitions for readmission after any intervening term of enrollment. Dismissed students who are readmitted and again fail to meet the requirements for continuing enrollment will be permanently dismissed and may not appeal to continue.

This continuing enrollment appeals process is separate from the unsatisfactory academic progress appeal with Student Financial Aid. Students subject to suspension or dismissal must be allowed to continue enrollment before submitting a satisfactory academic progress appeal for financial aid eligibility. Further information on satisfactory academic progress is available in the *Financial Information* section of this catalog and in the publication *Financing Your Clemson University Education*.

Grade Protections

A student wishing to protest a final course grade must first try to resolve any disagreement with the instructor. If unable to reach a resolution, the student may follow the procedures listed under "Academic Grievance Committee." Grievances must be filed within 90 calendar days (exclusive of summer vacation) of the date of the last exam for the term.

Repeating Courses Passed

A student may repeat a course passed with a grade lower than B. If the grade is a D and the student has sufficient W hours and sufficient Academic Redemption hours, the Academic Redemption Policy below will apply. Otherwise, both grades will be calculated in the grade-point ratio. In either case, credit for the course will be counted only once toward the number of hours required for graduation. For financial aid purposes, duplicate credits do not count as credits completed for satisfactory academic progress. If a student repeats a course passed with a grade of B or better, the credits attempted as well as credits and grade points earned will be removed from the cumulative summary.

Repeating Courses Failed

A student who has failed a course cannot receive credit for that course until it has been satisfactorily repeated hour for hour in a class; except that in the case of correlated laboratory work, the number of hours to be taken shall be determined by the instructor. Where separate grades for class and laboratory work are given, that part of the subject shall be repeated in which the failure occurs. Successfully repeating a course previously graded F does not erase the original F grade from the student's record. If a student repeats a course in which the previous grade was F and the student has not exhausted his/her allotment of W hours or Academic Redemption hours, the Academic Redemption Policy below will apply. Otherwise, both grades appear on the record and are computed in the cumulative grade-point ratio.

Academic Redemption Policy

The Academic Redemption Policy (ARP) allows a student to repeat up to nine hours of coursework in which a D or F was earned if he/she has sufficient W hours remaining. In all cases, the grade earned in the course used to redeem the earlier course will be used in computing the grade-point ratio.

The ARP will apply to all enrolled undergraduate students beginning fall semester 2003. Courses taken prior to fall semester 2003 may not be considered for ARP. The following conditions apply:

For students with sufficient W hours, the first nine hours of repeated coursework will automatically be computed for academic redemption, and these hours will be deducted from the student's W hours. If sufficient W hours are not available, the ARP will not apply.

Both grades will remain on the transcript, degree progress report, and other official documents. For financial aid purposes, courses repeated under this policy resulting in duplicate credit do not count for satisfactory academic progress.

If a student drops a repeated course during the period in which the Academic Calendar indicates a W grade is assigned, then both the ARP hours and W hours will be subtracted from the student's remaining ARP and W hours.

The ARP shall apply only to courses taken at Clemson University. The earlier course graded D or F can only be redeemed by repeating the same course. Course substitutions are not permitted.

Students may not invoke the ARP after they have graduated. After graduation, students may repeat coursework, but both grades will be calculated in the grade-point ratio.

The ARP may not be applied to a course taken on a Pass/Fail basis or to any course in which the student was previously found guilty of academic dishonesty.

CLASSWORK

Academic Advising

Each student is assigned an academic advisor in his/her major area. It is the responsibility of the student to consult with the advisor during registration. The advisor will assist the student in scheduling courses so as to fulfill the requirements of the degree program; nevertheless, it is the responsibility of the student to fulfill the relevant requirements of the degree. Advisors also maintain files on individual advisees to assist in academic planning.

Course Prerequisites

Prerequisites for each course are enumerated under each course in the *Courses of Instruction* section of this catalog. In addition to these requirements, colleges and departments may also establish other standards as conditions for enrollment. It is the student's responsibility to refer to individual college and curricular information for specific standards.

Class Attendance

College work proceeds at such a pace that regular attendance is necessary for each student to obtain maximum benefits from instruction. Regular and punctual attendance at all class and laboratory sessions is a student obligation, and each student is responsible for all the work, including tests and written work, in all class and laboratory sessions. No right or privilege exists that permits a student to be absent from any given number of class or laboratory sessions except as stated in the syllabus for each course. At the same time, it is obvious that students have valid reasons for missing classes; the instructors are expected to be reasonable in the demands they place on students. In this regard, instructors must inform the students in the syllabus required in every class what constitutes excessive absences and the penalty, if any, for such absences. Faculty who impose penalties for excessive absences must keep accurate attendance records.

Some students are on scholarships and/or grants-in-aid overseen by the University Scholarships and Awards Committee. The acceptance of such scholarships and/or grants-in-aid may require participation in events both on and off campus. Additionally, students occasionally are required to miss class

because of participation in co-curricular activities, such as class trips, that the faculty members note on their syllabi. The student must discuss these activities with the faculty members whose classes will be missed well in advance of their occurrences. The documentable absences are necessary, and the instructor will make arrangements for those students to make up graded work that takes place during those necessary absences. The time, location, and nature of the make-up work will be at the discretion of the instructor. If required, documentation will be provided to instructors by students.

Instructors are expected to set reasonable policies in working with those student personal documentable absences that are truly beyond the student's control. After reviewing the reason for the absence, the instructor at his/her discretion may allow the student to make up the graded work missed.

All other aspects of class attendance are within the discretion of the instructor, department, or college responsible for the course. If a student feels unfairly treated in any attendance-related situation, the student has the right of appeal to the Academic Grievance Committee.

First Day Class Attendance

All students are required to attend the first scheduled day of classes and labs. Students who cannot attend the first class are responsible for contacting the instructor to indicate their intent to remain in that class. If a student does not attend the first class meeting or contact the instructor by the second meeting or the last day to add, whichever comes first, the instructor has the option of dropping that student from the roll.

Dead Days

During Dead Days, all regularly scheduled classes are conducted; however, course testing on these days is limited to scheduled laboratory and one-semester-hour course final exams and make-up tests. Dead Days are observed during fall and spring semesters only. Dead Days do not apply to courses numbered 600 or above.

Auditing Policies

Qualified students may audit courses upon the written approval of the instructor. Auditors are under no obligation of regular attendance, preparation, recitation, or examination and receive no credit. Participation in classroom discussion and laboratory exercises by auditors is at the discretion of the instructor. A student who has previously audited a course is ineligible for credit by examination.

Undergraduate and graduate students enrolled in 12 or more hours may audit courses at no additional charge. Others interested in auditing should verify their eligibility through the Registrar's Office.

Combined Bachelor's/Master's Plan

Under this plan, students may reduce the time necessary to earn both degrees by applying graduate credits to both undergraduate and graduate program requirements.

To be eligible for this plan, students must have completed their bachelor's curriculum through the junior year (minimum 94 credits) and have a minimum overall grade-point ratio of 3.40. To apply, students submit to the Graduate School an *Application for Admission to a Combined Bachelor's/Master's Plan* with endorsements by the program coordinator or department chair of both bachelor's and master's programs. If accepted, the student will be given conditional admission to the master's program pending completion of his or her bachelor's degree and submission of satisfactory GRE or GMAT scores, if required. Combined Plan students are not eligible for graduate appointments for financial aid until their Bachelor's degree has been awarded.

A maximum of 12 credits of graduate courses in the master's program may be applied to the bachelor's program. As determined by the participating bachelor's program, graduate courses may be applied to the bachelor's degree as free or technical electives, or by substitution of 800-level courses for required undergraduate courses. Under no circumstances can 600-level counterparts of courses required in the bachelor's program be counted toward master's requirements.

Not all programs may choose to participate in the Combined Bachelor's/Master's Plan. Those bachelor's programs that do participate may permit fewer than 12 graduate credits to count toward the bachelor's degree. Furthermore, the bachelor's programs determines the acceptability of specific graduate courses to meet their curriculum requirements, and the participating master's programs control admission of students into their programs and their courses. Students should consult individual academic units for specific requirements.

Enrollment in Graduate Courses

Enrollment of Clemson University seniors in any graduate course is subject to approval by the department offering the course and the Graduate School. This approval is required prior to registration. Approval forms are available from the Graduate School Office in E-106 Martin Hall or on the Web at www.grad.clemson.edu/uf_general.html. The total course workload for the semester must not exceed 18 hours, and the cumulative graduate credits earned by seniors shall not exceed 12 semester hours.

Seniors with a cumulative grade point ratio of 3.0 or higher may enroll in 700- or 800-level courses and may use these courses to meet requirements for the bachelor's degree; however, courses used for this purpose cannot be counted later toward an advanced degree. Alternatively, such students may take 600-, 700- or 800-level courses in excess of the requirements for their undergraduate degrees and may request that these courses be included as a part of their graduate program if they are subsequently admitted to the Graduate School. Courses cannot be taken at the 600 level if their 400-level counterparts are required for the undergraduate degree in the same academic major as the proposed graduate degree.

A Clemson senior with a cumulative grade-point ratio less than 3.0 may apply to the Graduate School for conditional acceptance. If accepted, the student

may enroll in graduate courses for inclusion in a future graduate program, subject to approval of Form GS6. The form must be turned in and accepted by the Graduate School before a student can register for graduate courses.

In all cases, the credits and quality points associated with senior enrollment in graduate courses will be part of the undergraduate record.

GRADUATION REQUIREMENTS

A candidate for an undergraduate degree is a student who has turned in a completed diploma application by the deadline prescribed in the University calendar for a particular graduation date.

Residence Requirement

To qualify for an undergraduate degree, a student must complete through instruction from Clemson a minimum of 37 of the last 43 credits presented for the degree. (To qualify for the five-year professional undergraduate degree in Landscape Architecture, a student must complete through instruction from Clemson, a minimum of 42 of the last 48 credits presented for the degree.)

Make-up of Incompletes Received in Last Semester

A candidate for a degree who receives one or more grades of I in the semester immediately prior to graduation shall have an opportunity to remove the unsatisfactory grades provided the final grades are received in the Registration Services Office, E-206 Martin Hall, by the time grades for candidates for graduation are due. A student who qualifies for graduation under this regulation will be awarded his/her degree on the regular date for the award of degrees.

Special Requirements

A cumulative grade-point ratio of 2.0 is required for graduation, and candidates for degrees must be officially accepted in the major in which they are applying for a degree in the term prior to application for the degree. Candidates for degrees are required to apply for their diplomas within three weeks following the opening of the final semester or the opening of the first summer session prior to the date the degrees are to be awarded. Application forms are available in the Enrolled Student Services Office, 104 Sikes Hall.

Awarding of Degrees Posthumously

An undergraduate student meeting the following minimum requirements may be awarded a degree posthumously on the recommendation of the faculty of the college concerned.

- The student had at least a 2.0 grade-point ratio at time of death
- Including credits scheduled in the term in which death occurred, the student a) had satisfied 75% of the degree requirements and b) met the residency requirement for a degree which requires that 37 of the last 43 credits presented for a degree be earned at Clemson.

Credit Limitation

If all work toward a degree is not completed within six years after entrance, the student may be required to take additional courses.

Academic Honors

Honor Graduates

To be graduated with honors, a student must have a minimum cumulative grade-point ratio as follows: cum laude—3.4, magna cum laude—3.7, and summa cum laude—3.9.

Honor Lists

At the end of the fall and spring semesters, the following lists shall be compiled of undergraduate students who have achieved grade-point ratios of 3.5 to 4.0 on a minimum of 12 semester hours, exclusive of Pass/Fail coursework.

Dean's List—3.5 to 3.99 grade-point ratio

President's List—4.0 grade-point ratio

Honors and Awards

The University offers a number of awards for outstanding achievement in specific fields and endeavors. Recipients are chosen by selection committees and are announced at the annual Honors and Awards Day program or other appropriate ceremonies. Detailed information relating to such awards is available in the offices of the academic deans and department chairs.

ACADEMIC RECORDS

The student's permanent academic record is maintained in the Registrar's Office and contains personal identifying information, grades, and credits. Where appropriate, statements of a corrective nature, withdrawals, suspension for failure to meet academic standards, suspension for disciplinary reasons, and graduation data are added. The academic record is a historical record of the student's academic progress.

Classification

All new students are classified as freshmen unless they have attended another college prior to entrance. Students who have completed college work elsewhere will be classified on the basis of semester hours accepted at Clemson rather than the amount of work presented. To be classified as a member of any class other than freshman, students must meet the credit-hour requirements below:

Sophomore—minimum 30 credit hours

Junior—minimum 60 credit hours

Senior—minimum 95 credit hours

Change of Major

Any undergraduate student who meets the Continuing Enrollment Policy after attempting 12 credit hours at Clemson University (or who is allowed to continue by virtue of a semester 2.2 grade-point ratio on 12 earned credits or who is allowed to continue through appeal to the Continuing Enrollment Appeals Committee or by other authorization of this committee) may transfer from one major to another. Any college or department which seeks an exception to this policy must have the approval of the collegiate dean and the provost.

Withdrawal from the University

A student may withdraw from the University subject to the restrictions in the section on *Withdrawal*. Students who exceed these restrictions shall have final grades recorded. Any variance from the restrictions must be approved by the provost or the provost's designee and must be requested within 90 calendar days (exclusive of summer vacation) of the date of the last exam for the term. The student must document the circumstances supporting the request. All University withdrawals (including withdrawing from the only course in which a student is enrolled) must be processed by the Associate Dean of Undergraduate Academic Services. Students should report to E-108 Martin Hall. Students receiving financial aid who withdraw from the University may have to repay significant portions of their financial aid. For financial aid purposes, enrollment is defined and satisfactory academic progress levels are established as of the last day to register or add classes. Withdrawing from the University can negatively impact financial aid eligibility if a student has not completed a sufficient number of hours. Details are available in the publication *Financing Your Clemson University Education*.

Academic Renewal

The student who has not enrolled at Clemson for a period of two or more academic years may apply to the Appeals Committee on Continuing Enrollment for readmission under special conditions known as academic renewal. Under these conditions, the previous credits attempted and quality-point deficit will not constitute a liability in a new grade-point computation; however, no credits passed or their attending quality points will be available to the student for a degree at Clemson. The previous record will appear on the permanent record as well as the notation of readmission under the policy of academic renewal. Students returning under the academic renewal policy who apply for financial aid should submit written notification of their status to the Office of Student Financial Aid in order to update their academic progress record. For financial aid purposes, terms enrolled in prior to academic renewal are counted in the 12 semesters allowed for satisfactory academic progress.

Transcripts

Official transcripts are issued only at the authorized, written request of the student. Requests should be directed to Transcripts, 104 Sikes Hall, Box 345125, Clemson, SC 29634-5125. Payment in advance is required and may be made by Discover, Visa, MasterCard, Tiger Stripe, check (payable to Clemson University), or cash. The following must be included with the transcript request: full name (including any names used while at Clemson), social security number, current address, date of birth, date the student last attended Clemson, where the transcript is to be sent, and payment of \$5 per transcript. Telephone requests will not be honored. Transcript requests are normally processed within 48 hours, but additional processing time may be required at the end of a semester. Information is available from the Enrolled Student Services Office at the address above or by telephone at 864-656-2173. Official transcripts are not issued for those who are indebted to the University.

ACADEMIC INTEGRITY

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a "high seminary of learning." Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form.

I. Academic Integrity Policy

A. Any breach of the principles outlined in the Academic Integrity Statement is considered an act of academic dishonesty.

B. Academic dishonesty is further defined as:

1. Giving, receiving, or using unauthorized aid on any academic work;

2. Plagiarism, which includes the copying of language, structure, or ideas of another and attributing the work to one's own efforts;

3. Attempts to copy, edit, or delete computer files that belong to another person or use of Computer Center account numbers that belong to another person without the permission of the file owner, account owner, or file number owner;

C. All academic work submitted for grading contains an implicit pledge and may contain, at the request of an instructor, an explicit pledge by the student that no unauthorized aid has been received.

D. It is the responsibility of every member of the Clemson University community to enforce the Academic Integrity Policy.

II. Academic Integrity Committee

The power to hear cases of academic dishonesty is vested in an Academic Integrity Committee.

A. Structure

The Academic Integrity Committee is composed of twenty members as follows:

1. Ten tenured members of the faculty; two members from each college elected by their respective collegiate faculties. Faculty members will be elected on a staggered term basis, serving for a period of two years after initiation of staggered terms. Terms commence with fall semester late registration.

2. Ten members of the undergraduate student body; two from each college. Student members are nominated by the Student Body President, through an application and interview process in the spring semester, approved by the Student Senate, and appointed by the provost for terms of two years. Students must have a 3.0 grade-point ratio at the time of appointment and must have completed 30 hours by the end of the spring semester. Nominations will be made in the spring semester with terms of service commencing with fall semester late registration.

3. The committee is divided into four standing boards, hereafter referred to as hearing boards, which will hear the cases of academic dishonesty. Hearing boards convene on a weekly, rotational basis unless there are no cases to be heard. For summer sessions, the Associate Dean of Undergraduate Academic Services must maintain at least one hearing board to hear cases.

4. Hearing boards are comprised of two faculty members, two students, and one chairperson. Quorum, for a hearing board, is one student, one faculty member, and a chairperson. Decisions by the hearing board will be by majority vote.

5. Chairpersons will be elected from within the Committee's membership. Two chairpersons are selected from the faculty membership and two from the student membership.

6. Before hearing any cases, a new member of the committee must undergo a training session(s) with the Associate Dean of Undergraduate Academic Services.

7. The Associate Dean of Undergraduate Academic Services is the administrative coordinator of the Academic Integrity Committee.

B. Procedures

1. When, in the opinion of a faculty member, there is evidence that a student has committed an act of academic dishonesty, the faculty member shall make a formal written charge of academic dishonesty, including a description of the misconduct, to the Associate Dean of Undergraduate Academic Services. At the same time, the faculty member may, but is not required to, inform each involved student privately of the nature of the alleged charge.

2. When, in the opinion of the student, there is evidence that another student has committed an act of academic dishonesty, he/she should contact the faculty member for the course to discuss the incident. After being contacted, if, in the opinion of the faculty member, there is evidence that a student has committed an act of academic dishonesty, the faculty member shall make a formal written charge of academic dishonesty, including a description of the misconduct, to the Associate Dean of Undergraduate Academic Services. At the same time, the faculty member may, but is not required to, inform each student involved privately of the nature of the alleged charge.

3. When the Associate Dean of Undergraduate Academic Services has received a formal charge of an alleged violation, he/she will contact the student involved privately to notify him/her of the charge and at the same time will provide the student with a copy of the charge and a copy of the procedures that the Academic Integrity Committee has adopted, pursuant to number 6 below. If a student is charged with academic dishonesty, he/she may not withdraw from the course unless he/she is exonerated of the charge.

4. After informing the student involved, the Associate Dean of Undergraduate Academic Services will convene one of the boards of the Academic Integrity Committee within 14 calendar days (exclusive of University holidays) of his/her being notified of an alleged violation. (Students charged in the spring term, but not enrolled in summer sessions, may be given a continuance to the next fall term.) All students will be presumed innocent of a violation until found guilty by a hearing board. Each party is responsible for having present at the hearing all witnesses that he/she wishes to speak on his/her behalf.

5. A charge of academic dishonesty in a course must be made within thirty days after the beginning of the next term, exclusive of summer vacation. If an *I* (Incomplete) is given in a course, the grade in the course is considered to be final when the *I* is made up.

6. The Academic Integrity Committee will adopt its procedures, to be followed by all hearing boards, prior to the first case heard by a hearing board. In addition to providing the student with a copy of the procedures, as stated in number 3 above, the Associate Dean of Undergraduate Academic Services will provide a copy of the procedures to the involved faculty member and also the hearing board members. The Associate Dean of Undergraduate Academic Services will also retain copies of these procedures. The procedures must afford both faculty and students the opportunity to present their cases and the opportunity for rebuttal.

7. In cases in which there is a finding of guilt, the faculty member may consult with the Associate Dean of Undergraduate Academic Services to consider any past precedent established regarding academic penalties levied in similar cases. Faculty members must inform the Associate Dean of Undergraduate Academic Services of the academic penalty for a student found guilty by a hearing board.

8. The Associate Dean of Undergraduate Academic Services is responsible for notifying the registrar and all other appropriate University personnel of the finding of guilt and the academic penalty. The Associate Dean of Undergraduate Academic Services retains all records of academic dishonesty cases and their findings in accordance with the University's Records Retention Policy.

C. Penalties

1. Upon a finding of "not guilty" by a hearing board, the student's record will not reflect the incident.

2. Upon a finding of "guilty" by a hearing board, the Associate Dean of Undergraduate Academic Services will notify the student and faculty member of the decision immediately. If the offense is the first for the student, then the faculty member has the ability to determine the academic penalty, which shall not exceed a grade of *F* for the course.

3. If the finding of guilt is not the student's first offense, the student will receive a grade of *F* for the course, will be suspended from the University for one or more semesters, and may be permanently dismissed from the University. The hearing board will determine the period for which the student will be suspended or, if applicable, permanently dismissed. Suspension or dismissal requires the approval of the President of the University.

D. Appeals

1. Students do not have the option to appeal a decision of guilt rendered by the hearing board, whether it is the first, second, or any subsequent offense. Students do not have the option to appeal the penalty determined by the faculty member for first offenses or to appeal the grade of *F* for the course given for second offenses.

2. For offenses resulting in suspension or permanent dismissal, students have the option to present written information to the President of the University to appeal the length of the suspension or to appeal a decision of permanent dismissal. Students must present information in their defense, as allowed in this paragraph, to the President within five working days after receipt of written notification of the suspension or dismissal. However, as stated in number 1 above, students cannot appeal a decision of guilt rendered by the hearing board.

ACADEMIC GRIEVANCE COMMITTEE

I. General

The Academic Grievance Committee hears all grievances involving the following: (a) allegations by an undergraduate student against a faculty or staff member of discrimination in academics on the basis of race, color, national origin, sex, age, religion, disability, or veterans status (except in those cases where the grievance involves student employment); (b) grievances of a personal or professional nature involving an individual undergraduate student and a faculty member; (c) claims by an undergraduate student concerning the inequity of final grades. (The only aspects of a final grade case that are grievable are claims by students of final grades being changed because of personal or professional reasons. Students may not grieve issues such as quality of instruction or the difficulty of testing, for example) and (d) claims by an undergraduate student of unfair treatment in an attendance related issue. In all unresolved cases, the committee makes its recommendations to the President through the provost. All proceedings of the committee are confidential. (For possible grievances arising from the inability to understand teachers whose first language is not English, the student must follow the English Fluency Policy referenced on page 2 and in the *Student Handbook and Schedule of Classes*.)

The Academic Grievance Committee is composed of 28 members as follows:

A. Fifteen members of the faculty, three members from each college. Members are appointed on a staggered basis by the respective college deans and serve for a period of three years. Term commences with fall semester registration.

B. Twelve undergraduate students, nominated by the student body president, approved by the Student Senate and appointed by the Provost for one-year terms. Nominations should be made in the spring semester. Term of service commences with fall semester late registration. At least one and no more than three students shall be appointed from any one college.

C. Dean of Student Life (or designee);

D. The Senior Vice Provost and Dean of Undergraduate Studies shall appoint the chairperson from those faculty members who have previously served.

II. Rules and Procedures for Academic Grievances

1. Any student filing a grievance must first attempt to resolve it by consulting with the involved faculty or staff member for resolution. In the event no resolution is reached, the student shall consult serially with the Ombudsman, who shall remain a neutral party, in the Office of Undergraduate Academic Services, the department chair and dean of the faculty member, who shall hear the grievance and act as mediators. Consultation by any party with the Ombudsman shall remain confidential. The Ombudsman, dean, department chair or immediate staff superior, faculty or staff member and student shall make every effort to reach a solution.

2. If the grievance remains unresolved, the student may bring a written statement detailing the grievance before the Academic Grievance Com-

mittee. The student must report to the Office of Undergraduate Academic Services and secure a checklist form which the student will use to document the following: (a) the dates of those consultations described in Procedure 1, above, (b) the names of those persons consulted, and (c) the signature of the collegiate dean attesting that no resolution could be reached. (Note: If all parties agree, the checklist may be signed and dated during the initial consultation.) Both the written statement and the checklist form must be delivered to the Office of Undergraduate Academic Services within 90 calendar days (exclusive of summer vacation) of the date of the last exam for the term in which the student alleges to have been aggrieved; or, in a case involving a protest of a final grade, the grievances must be filed within 90 calendar days of the date of the last exam for the term (exclusive of summer vacation) in which the student alleges that an inequitable grade was recorded. The Office of Undergraduate Academic Services will retain the original documents and forward a copy of the grievance to the chairperson of the Academic Grievance Committee. In a case involving a protest of final grade, the Office of Undergraduate Academic Services will notify the Office of Records and Registration of the filed grievance. The failure of a student to file a grievance within the 90-day period will cause him/her to forfeit his/her right to file a grievance under this procedure. (d) If a student files a grievance, the professor has 90 days (excluding summer) to respond.

3. The documents referred to in Procedure 2, shall be delivered to the chairperson of the Academic Grievance Committee. The chairperson shall, upon receipt of the documents, appoint a subcommittee consisting of a chairperson who is a faculty or staff member of the committee and at least two other committee members, including at least one student, to investigate the grievance. If possible, the subcommittee shall include members who are not in the same college as the grievant.

4. The committee members appointed by the chairperson will constitute the subcommittee to investigate the grievance. A minimum of three subcommittee members, including at least one student member, must be present for the subcommittee to conduct the hearing described in Procedure 7.

5. The subcommittee to investigate the grievance will attempt to gather all information pertinent to the grievance in separate meetings with the individuals who give information concerning the grievance; however, after the separate meetings have been held, the subcommittee may question the student and faculty or staff member simultaneously in one meeting. Such a joint meeting will be held only if the subcommittee deems it necessary for clarifying the facts.

6. The Academic Grievance Committee will, to the greatest extent possible, handle each case in a confidential manner.

7. The hearing on the grievance will be informal and shall be closed to the public. The chairperson shall take whatever action is necessary to ensure an equitable, orderly and expeditious hearing. Minutes of the meeting shall be taken, and all parties to the grievance shall be given an opportunity to be heard. In addition, the chairperson may request the presence of any other person who can supply informa-

tion pertinent to the grievance. Witnesses shall not be present during the hearing proceedings except when they are called to speak before the committee. The parties shall be permitted to question all individuals who are heard by the committee. If any witness is unable to be present at the hearing, the chairperson may, at his/her discretion, accept a written statement from that witness to be presented at the hearing. The parties shall be accorded the right to assistance of counsel of their own choice; however, counsel shall not be permitted to participate actively in the proceedings.

8. Upon conclusion of the hearing, the subcommittee shall reach, by majority vote, a posed solution to the grievance. The subcommittee chairperson shall then formulate the findings in writing and seek to obtain from the parties involved in the grievance signed acceptance for a recommended solution to the grievance. If all parties to the grievance accept the solution posed by the subcommittee, the matter of the grievance will be considered closed when the solution has been implemented. Copies of the written findings and recommended solution will be forwarded by the subcommittee chairperson to all parties to the grievance for acceptance via return receipted certified mail. Each party will be asked to indicate acceptance of the posed solution by signing and returning the letter within 14 calendar days of its date. Failure to respond within 14 calendar days will constitute acceptance. Proper notification of the solution arrived at by the Academic Grievance Committee will then be mailed by the subcommittee chairperson to the involved faculty or staff member, department chair of the faculty member or immediate superior of staff member, the involved collegiate dean, and Associate Dean of Undergraduate Academic Services. In a case involving a protest of a final grade, the subcommittee chairperson will also notify the Office of Records and Registration of the solution arrived at by the Academic Grievance Committee.

9. If, after the conclusion of the hearing on the grievance, the chairperson cannot secure acceptance of the posed solution, the grievance shall be referred to the President of the University via the provost with the committee's recommended solution to the grievance along with all supporting evidence previously submitted to the Academic Grievance Committee. When grievances are referred in this manner, the President, on behalf of the University, shall make the final decision on the solution to the grievance and will then notify the student, the involved faculty or staff member, department chair of the involved faculty member or immediate superior of the staff member, involved collegiate dean, and Associate Dean of Undergraduate Academic Services of the University's final decision. In a case involving a protest of a final grade, the President will also notify the Office of Records and Registration of the University's final decision.

10. The chairperson shall keep in confidence all records pertinent to each grievance and pass these records to the Office of the Provost for filing. Records shall be available to succeeding chairpersons of the Academic Grievance Committee.

11. The Academic Grievance Committee shall make every reasonable effort to resolve every grievance presented to it by the end of the semester in which each grievance is received.

12. These procedures can be changed by the Academic Council. Such changes shall not affect any case under consideration at the time of the change. Notification of any changes to the procedure shall be given to the President of the University via the Academic Council.

ACADEMIC MISCONDUCT FOR FORMER STUDENTS

It is possible that an act of academic misconduct will remain undiscovered until after a degree is awarded. In such a case, Clemson University reserves the right to revoke any degree based on new revelations about scholarly issues including, but not restricted to, admission credentials, all forms of coursework, research, theses, dissertations, or other final projects.

I. Submission of Fraudulent Admissions Credentials

The submission of fraudulent admissions credentials in the student's application or any other documents submitted for admission to Clemson University may result in initiation of action under the Policy and Procedure on Revocation of Academic Degrees.

II. Academic Dishonesty in Coursework

A. In the event that the act is alleged to have occurred within the context of a course and is consistent with the general definition of academic dishonesty presented in Sections I of the Policy or Academic Misconduct for Enrolled Students, the same procedures in that policy will apply except for academic misconduct listed in III below.

B. Graduate Students—If the resulting penalty is either the assignment of a grade of *D* or *F* in a required graduate course, or the issuance of any grade that causes the student not to possess a cumulative *B* average in both graduate courses and in all courses, action under the Policy and Procedures on Revocation of Academic Degrees may be initiated.

C. Undergraduate Students—If the resulting penalty causes the student to no longer have the necessary credit hours, coursework, or grade average for receiving a degree, action under the Policy and Procedures on Revocation of Academic Degrees may be initiated.

III. Falsification of Data and Plagiarism in Theses, Dissertations, or Other Final Projects

Data falsification, plagiarism (as defined in the Academic Misconduct Policy) and other acts of academic dishonesty in a thesis, dissertation or other final project are serious acts of misconduct. Allegations of this type of misconduct may result in initiation of action under the Policy and Procedure on Revocation of Academic Degrees.

REVOCATION OF ACADEMIC DEGREES

Preamble

Academic institutions have a critical responsibility to provide an environment that promotes integrity, while at the same time encouraging openness and creativity among scholars. Care must be taken to ensure that honest error and ambiguities of interpretation of scholarly activities are distinguishable from outright misconduct. This policy is applicable to fraudulent or other misconduct in obtaining an academic degree which is so egregious that a mechanism for revoking an academic degree, either graduate or undergraduate, must be undertaken. The Clemson University Board of Trustees has the sole authority to revoke any degree previously awarded.

Definitions

As used herein, the following terms shall apply:
A. When the degree holder was an undergraduate student:

1. "Dean" shall mean the dean of the academic college where student was enrolled.

2. "Committee of Investigation and Recommendation" shall be composed of the members of the standing University undergraduate Continuing Enrollment Appeals Committee. An undergraduate student will be appointed to the Committee of Investigation and Recommendation by the President of the Student Body within ten (10) calendar days of notification by the President of the Faculty Senate. Any member of the Continuing Enrollment Appeals Committee who is a faculty member in the department which awarded the degree involved shall not be a member of the Committee of Investigation and Recommendation for that particular investigation. If there are fewer than three (3) non-disqualified faculty members, the President of the Faculty Senate shall appoint additional faculty members to bring the number of faculty committee members up to three (3). If the President of the Faculty Senate is from the same department that awarded the degree involved, the President-Elect of the Faculty Senate shall appoint the additional member.

B. When the degree holder was a graduate student:

1. "Dean" shall mean the Dean of the Graduate School.

2. "Committee of Investigation and Recommendation" shall be composed of the members of the standing University Graduate Admissions and Continuing Enrollment Appeals Committee, except for the Associate Dean of the Graduate School who shall not be a member of the Committee of Investigation and Recommendation. A graduate student will be appointed to the Committee of Investigations and Recommendation by the President of Graduate Student Government within ten (10) calendar days of notification by the President of the Faculty Senate. Any member of the Graduate Admissions and Continuing Enrollment Appeals Committee who is a faculty member in the department which awarded the degree involved shall not be a member of the Committee of Investigation and Recommendation for that particular investigation. If there are fewer than three (3) non-disqualified faculty members, the President of the Faculty Senate shall appoint additional faculty members to

bring the number of faculty committee members up to three (3). If the President of the Faculty Senate is from the same department that awarded the degree involved, the President-Elect of the Faculty Senate shall appoint the additional member.

Complaint

An allegation or complaint involving the possibility of misconduct can be raised by anyone. The allegation should be made in writing to the dean.

Initial Review

The dean will conduct the initial review to determine whether or not the allegation has merit. The dean may discuss the matter with the former student's advisory committee (if any) and other faculty as appropriate. The dean may also contact persons outside the University who may be able to provide factual information on the alleged misconduct or who may otherwise have expertise concerning issues involved in the alleged misconduct. If the dean determines that the allegation has no merit, he/she will terminate the investigation. If the dean determines that serious academic misconduct is suspected, the dean will notify the President of the Faculty Senate in writing in a confidential manner. The dean shall also notify the Vice President for Academic Affairs and Provost of the charge but will not discuss any details of the charge.

Committee of Inquiry

The President of the Faculty Senate shall, within (10) calendar days of receipt of the notification from the dean, appoint three (3) faculty members to the Committee of Inquiry and notify the President of Graduate Student Government or the President of the Student Body, as appropriate, who shall appoint a graduate or undergraduate student, as appropriate, to the Committee of Inquiry within ten (10) calendar days of notification. The President of the Faculty Senate shall also notify the degree holder of the formation of a Committee of Inquiry.

If the Faculty Senate President is from the same department that awarded the degree involved, the President-Elect of the Faculty Senate shall appoint the Committee of Inquiry. The faculty members will be appointed from departments which did not award the degree involved. The Committee will elect its chairman from the faculty members on the Committee.

For each allegation, the Committee of Inquiry will review the complaint and any other information provided by the dean and determine whether there is sufficient evidence to warrant a formal charge of academic misconduct and further investigation under this policy. While the Committee of Inquiry shall not make a recommendation as to whether a degree should be revoked, the purpose is to provide a review to separate frivolous, unjustified or mistaken allegations from those requiring a more detailed and formal investigation. The Committee of Inquiry will review the evidence and must determine that the alleged misconduct more probably than not occurred in order for the committee to recommend a formal charge and further investigation.

Within thirty (30) calendar days of the formation of the Committee of Inquiry, the Committee of Inquiry will submit a written report to the Presi-

dent of the Faculty Senate. If the Committee of Inquiry's report finds that the investigation should not proceed, the President of the Faculty Senate shall terminate the investigation and notify the appropriate persons. If the Committee of Inquiry's report finds that a formal charge and further investigation are warranted, the President of the Faculty Senate shall, within ten (10) calendar days of receipt of the report of the Committee of Inquiry, send a copy of that report to the dean and to the Committee of Investigation and Recommendation. The President of the Faculty Senate shall also immediately notify the President of Graduate School Government or President of the Student Body (whichever is appropriate) that a student representative needs to be appointed to the Committee of Investigation and Recommendation. The President of the Faculty Senate shall also notify the Vice President for Academic Affairs and Provost of the Committee of Inquiry's recommendation. No details of the charge will be discussed. *Note:* A majority vote of the Committee of Inquiry is necessary to recommend that a formal charge and further investigation are warranted. A tie vote means that the investigation is terminated as stated herein.

Notification to Degree Holder

The dean shall issue in writing, within ten (10) calendar days of receipt of the report of the Committee of Inquiry, a formal charge of academic misconduct to the degree holder. This written notice shall detail the factual allegations for the charge and the evidence supporting the charge. This written notice shall also inform the degree holder that if the charges are substantiated, the degree holder's degree could be revoked. This written notice shall also inform the degree holder of his/her right to appear at a hearing as stated in this policy. The dean shall also send with this notice a copy of this Policy and Procedure on Revocation of Academic Degrees to the degree holder. This notice shall be delivered to the accused in person or sent by certified mail, return receipt requested.

Committee of Investigation and Recommendation

The Committee of Investigation and Recommendation shall extend to the degree holder due process which shall, at a minimum, include the following:

1. Notice of the nature of the complaint
2. Notice of the evidence supporting the complaint
3. Notice of the hearing
4. The opportunity to present evidence, including testimony
5. The opportunity to hear the testimony against the degree holder
6. The opportunity to ask questions of all witnesses
7. The opportunity to have an attorney or advisor present at the hearing; however, the role of the attorney or advisor shall be solely to assist the party, and the attorney or advisor shall not be permitted to participate actively in the proceedings.

The degree holder shall not be entitled to know the identity of the person(s) who originally made the complaint unless that person agrees that his/her identity can be revealed.

The chair of the Committee of Investigation and Recommendation shall inform the degree holder of the time and date of the hearing.

The dean or his/her designee shall present the accusation against the degree holder at the hearing and may have one additional representative present during the hearing. Under this section the term "dean" is understood to include the dean's designee, if such a designation is made.

The degree holder and the dean may submit written materials to the Committee of Investigation and Recommendation prior to the hearing. The chair of the Committee of Investigation and Recommendation shall make available the materials received to the other party and to all committee members. The hearing before the Committee of Investigation and Recommendation shall be held no sooner than thirty (30) calendar days and no later than ninety (90) calendar days after receipt of the report of the Committee of Inquiry unless the degree holder and the dean agree to a different date. All matters pertaining to the hearing shall be kept as confidential as possible and the hearing shall be closed to the public. A verbatim record of the hearing will be taken and a type-written copy thereof transcribed and made a part of the hearing record. The degree holder and the dean shall be responsible for having any witnesses they wish to testify in attendance at the hearing. Witnesses will be present only while testifying.

The chair of the Committee of Investigation and Recommendation shall take whatever action is necessary during the hearing to ensure a fair, orderly, and expeditious hearing. No formal rules of evidence will be followed. If any objection is made to any evidence being offered, the decision of the majority of the committee shall govern. Irrelevant, immaterial, or unduly repetitious evidence shall be excluded.

The degree holder and the dean shall be permitted to offer evidence and witnesses pertinent to the issues.

The dean shall present the case against the accused first. The accused shall then present his/her response.

The chair will allow each party to ask questions of the other party and will allow each party to ask questions of the other party's witnesses at the appropriate time during the hearing as determined by the chair. Member of the committee may ask questions of any party or any witness at any time during the hearing.

Within fifteen (15) calendar days of the conclusion of the hearing, the Committee of Investigation and Recommendation shall submit a written report to the Vice President for Academic Affairs and Provost. The report shall contain findings and a recommendation as to whether the degree holder's degree should be revoked. The Committee of Investigation and Recommendation must find clear and convincing evidence that serious academic misconduct has been committed in order to recommend the revocation of the degree holder's degree. If the Committee of Investigation and Recommendation does not find clear and convincing evidence of serious academic misconduct, the Com-

mittee of Investigation and Recommendation cannot recommend revocation of the degree holder's degree and the matter shall be closed. *Note:* A majority vote of the Committee of Investigation and Recommendation is necessary to recommend the revocation of a degree holder's degree. This means that a tie vote will result in the matter being closed.

At the same time that the report is sent to the Vice President for Academic Affairs and Provost, the chair of the Committee of Investigation and Recommendation shall send a copy of the report to the degree holder, the Dean, and other appropriate persons involved in the process.

If the Committee of Investigation and Recommendation recommends that the degree holder's degree be revoked, the chair shall also send a complete copy of the hearing record to the Vice President for Academic Affairs and Provost. The hearing record shall consist of the transcript of the hearing and all documents that were submitted to the committee. The chair of the Committee of Investigation and Recommendation shall label which documents were submitted by each party when forwarding this information to the Vice President for Academic Affairs and Provost.

If the Committee of Investigation and Recommendation recommends that the degree holder's degree be revoked, the chair shall also send a copy of the transcript of the hearing to the degree holder and the Dean at the same time that it is sent to the Vice President for Academic Affairs and Provost.

Vice President for Academic Affairs and Provost

If the Committee of Investigation and Recommendation recommends that the degree be revoked, the Vice President for Academic Affairs and Provost shall review the hearing record and the report of the Committee of Investigation and Recommendation. If the Vice President for Academic Affairs and Provost decides that the degree holder's degree should not be revoked, he/she shall notify the degree holder, the dean, the Committee of Investigation and Recommendation and other appropriate persons involved in the process, in writing, within twenty-one (21) calendar days of receipt of the transcript of the hearing, and the matter shall be closed. If the Vice President for Academic Affairs and Provost decides to recommend that the degree holder's degree should be revoked, the Vice President for Academic Affairs and Provost shall send that recommendation in writing to the President of the University within twenty-one (21) calendar days of receipt of the transcript of the hearing. The Vice President for Academic Affairs and Provost shall send to the President, along with his/her recommendation, the Committee of Investigation and Recommendation's report and the hearing record. The Vice President for Academic Affairs and Provost shall send a copy of his/her recommendation to the degree holder, the dean, the Committee of Investigation and Recommendation, and other appropriate persons involved in the process.

If the Vice President for Academic Affairs and Provost is disqualified from reviewing the case, the Senior Vice Provost and Dean of Undergraduate Studies shall be substituted for the Vice President for Academic Affairs and Provost.

President

If the Vice President for Academic Affairs and Provost recommends to the President that the degree holder's degree should be revoked, the President shall transmit that recommendation along with the report of the Committee of Investigation and Recommendation and the hearing record to the Executive Secretary of the Board of Trustees within thirty (30) calendar days of receipt. If the President wishes to make a recommendation, he/she shall review the recommendation of the Vice President for Academic Affairs and Provost, the report of the Committee of Investigation and Recommendation, and the hearing record and forward his recommendation to the Executive Secretary of the Board of Trustees within thirty (30) calendar days of receiving the recommendation of the Vice President for Academic Affairs and Provost.

Board of Trustees

The Executive Secretary of the Board of Trustees shall send to all trustees the hearing record, the recommendation of the Vice President for Academic Affairs and Provost, the report of the Committee of Investigation and Recommendation, and the recommendation of the President, if any. A majority vote by the Board of Trustees, at a duly constituted Board meeting, is required to revoke an academic degree. The decision of the Board of Trustees shall be final.

Guiding Principles

All actions taken by committees shall be effective by a majority vote.

All investigations, hearings, and actions shall be kept as confidential as possible except for notice of any revocation approved by the Board of Trustees.

A decision not to proceed at any stage of the proceedings set forth in this policy does not necessarily mean that the original complaint was groundless.

For good cause shown, at the request of either party and the approval of the other, the Vice President for Academic Affairs and Provost shall extend any time limit set forth in this policy. Any such time extension shall be communicated in writing to all appropriate parties.

Administrative Action if Degree is Revoked

If a degree is revoked by the Board of Trustees, the former student's transcript will be modified to reflect that the degree was revoked, and the former student will be informed of the revocation and requested to return the diploma. If the former student was enrolled in a program requiring a thesis or dissertation, all bound copies will be removed from the Clemson University Library. In addition, for doctoral students, University Microfilms, Inc. will be notified and requested to take appropriate action.

Students whose degrees have been revoked may be eligible to reapply for admission according to normal University procedures and policies in effect at the time of reapplication.

GENERAL EDUCATION

An undergraduate student whose enrollment in a curriculum occurs after May 15, 1996, must fulfill the general education requirements in the catalog in effect at the time. A student who withdraws from the University and subsequently returns after May 15, 1996, will be required to satisfy the general education requirements. Any variation in curricular or general education requirements shall be considered under the substitution procedure.

MISSION STATEMENT

Academic institutions exist for the transmission of knowledge, the pursuit of truth, the intellectual and ethical development of students, and the general well-being of society. Undergraduate students must be broadly educated and technically skilled to be informed and productive citizens. As citizens, they need to be able to think critically about significant issues. Students also need to be prepared to complete undergraduate work and a major course of study. The mission requires a high level of knowledge about and competence in the following areas: communication, computer use, mathematics, problem solving, natural sciences, social sciences, humanities, and arts. Thus the mission of general education is to provide Clemson undergraduate students with a structured base through which these needs can be met.

COURSE REQUIREMENTS

General education requirements in some curricula are more restrictive than those shown below.

Courses approved for Oral Communication, Writing Intensive, or Computer Skills credit are indicated in the *Courses of Instruction* section of this catalog in brackets (e.g. ENGL 314 3(3,0) [W,3]).

A. Communication and Speaking

Skills 12 hours

1. ENGL 101 and ENGL 102 *or*
ENGL 101 and ENGL 103 6 hours

2. Oral Communication 3 hours

ARCH 151	 O.1
ARCH 152	 O.1
ARCH 251	 O.1
C E 350	 O.1
C M E 242	 O.1
C M E 341	 O.1
C M E 407	 O.1
CH E 307	 O.1
CH E 407	 O.1
CH E 432	 O.1
CH E 444	 O.1
COMM 150	 O.3
COMM 250	 O.3
COMM 251	 O.3
E C E 320	 O.1
E C E 495	 O.1
E C E 496	 O.1
ENT 305	 O.2
ENT 462	 O.1
M E 401	 O.1
M E 402	 O.2

3. Writing Intensive 3 hours

ARCH 351	 W.1
ARCH 352	 W.1
ARCH 451	 W.1
B E 322	 W.1
B E 471	 W.1
C M E 342	 W.1
C M E 407	 W.1
C M E 441	 W.1
C R P 403	 W.2
CH E 307	 W.1
CH E 407	 W.1
CH E 432	 W.1
E C E 311	 W.1
E C E 312	 W.1
E C E 371	 W.1
E C E 417	 W.1
ECON 424	 W.2
ED EL 458	 W.1
ED EL 488	 W.1
ED SP 495	 W.1
ENGL 304	 W.3
ENGL 310	 W.2
ENGL 312	 W.3
ENGL 314	 W.3
ENGL 316	 W.3
ENGL 333	 W.3
ENGL 334	 W.3
ENGL 345	 W.3
ENGL 346	 W.3
ENGL 348	 W.3
ENGL 386	 W.2
ENGL 448	 W.3
HIST 314	 W.2
HIST 318	 W.2
HIST 323	 W.1
HIST 324	 W.1
HIST 353	 W.2
HIST 361	 W.2
HIST 365	 W.2
HIST 373	 W.2
HIST 387	 W.2
M E 401	 W.2
M E 402	 W.1
NURS 320	 W.1
NURS 330	 W.1
NURS 405	 W.1
NURS 406	 W.1
READ 459	 W.1
THEA (ENGL) 447	 W.3

B. Computer Skills 3 hours

AG ED 200	 C.3
ARCH 151	 C.1
ARCH 251	 C.1
ARCH 252	 C.1
B E 450	 C.1
C E 251	 C.1
C M E 407	 C.1
CH E 413	 C.1
CP SC 101	 C.3
CP SC 110	 C.3
CP SC 111	 C.3
CP SC 120	 C.3
CP SC 210	 C.3
E G 209	 C.1
ED F (AG ED, THRD) 480	 C.3
ENGR 120	 C.1
I E 220	 C.2
M E 205	 C.1
MUSIC 180	 C.2
NURS 140	 C.3
PRTM (FOR) 209	 C.3

C. Mathematical Sciences6 hours

EX ST 301	
MT HSC 101, 102, 106, 108, 115*, 116*, 117*, 118*, 203, 207, 301, 309	

*May be used by students graduating in Early Childhood, Elementary, and Special Education only

D. Physical or Biological

Science 8 hours

A two semester sequence in the same physical or biological science, each including a laboratory

ASTR 101/103, 102/104
BIOL 101, 102, 103, 104, 110, 111
CH 101, 102, 105, 106
GEOL 101/103, 102, 112/114
PH SC 107, 108
PHYS 122/124, 207, 208, 221/223, 222/224

E. Humanities 6 hours

1. Three hours selected from sophomore literature courses (200 level only) or foreign language literature (300 level or higher)
- ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210
FR 100, 400, 499
GER 301, 302, 401, 402, 403
ITAL 301, 302, 400
JAPN 406
SPAN 301, 303, 311, 401, 403, 404, 405, 406, 422, 499

2. Three hours selected from the following:

A H 101, 210
C H H203
CHIN 201, 202, 499
COMM 369, 402
ENGL 202, 203, 204, 205, 206, 207, 208, 209, H210, 350, 351, 353, 355, 356, 357, 380, 385, 386
FR 201, 202
G W (ENGL) 301
GER 201, 202
HUM 301, 302, 306, 309
ITAL 201, 202
JAPN 201, 202
MUSIC 210, 311, 312, 313, 314
PHIL 101, 102, 103, 303, 304, 315, 316, 317, 318, 320, 323, 324, 325, 326, 327, 330, 343, 344, 345
PORT 201, 202
REL 101, 102, 301, 302, 306, 307
RUSS 201, 202
SPAN 201, 202, 221
THEA 210, 315, 316, 317
W S 301

F. Social Science 6 hours

A A S 301
AGRIC 105
ANTH 201, 301, 320
APEC 202, 257, 302, 309, 319, 490
AVS 315
C H S H201, H202
C R D 357, (APEC, HLTH) 361
ECON 200, 211, 212, 301, 302, (MGT) 306, 307, 308, 309, 310, 314, 315, 324, 404
GEOG 101, 103, 301, 302, 303, 305, 306, 330, 340
HIST 101, 102, 122, 172, 173, 300, 301, 302, 303, 304, 305, 307, 311, 312, 313, 314, 316, 318, 321, 322, 323, 325, 327, 328, 329, 330, 333, 338, 339, 340, 341, 342, 351, 354, 355, 361, 363, 365, 370, 372, 373, 374, 375, 377, 378, 380, 381, 384, 385, 386, 387, 390, 391, (F&RR) 392, 393, 436
PO SC 101, 102, 302, 361, 381, 480
PRTM 201, 301
PSYCH 201, 306, 308, 320, 324, 330, 333, 340, 344, 345, 352, 355, 364, 368, 370, 375, H385
R S 301, (SOC) 401, (SOC) 459
SOC 201, 202, (C R D) 235, 310, 311, 330, 331, 350, 351, (E L E, PO SC, PSYCH) 356, (R S) 371, 380, 390, 391, 392, 393, 394, 396, 397, 494

COMPETENCY GOALS

A. Communication and Speaking Skills

A.1. English 101 and 102 or 103

Students completing English 102 or 103 with a passing grade should be able to demonstrate the following knowledge and skills:

1. An understanding of and ability to use the full range of the writing process including invention, drafting, revising, and editing.
2. The capacity to write a unified, coherent short essay with a suitable introduction and conclusion, well-organized and sufficiently developed paragraphs, and enough detail to support generalizations.
3. The capacity to summarize, analyze, and evaluate college-level fictional and non-fictional texts, including argumentative pieces expressing opinions different from their own.
4. The ability to use and evaluate basic library sources, including available databases.
5. The ability to effectively integrate and appropriately cite existing research in their own writing.
6. The ability to organize and sustain an argumentative essay that marshals sufficient and relevant evidence, avoids major logical fallacies, recognizes and responds to counter-arguments, and shows a rhetorical awareness of audience.
7. Skill at using varied sentence structure and length and appropriate sentence style and diction.
8. Ability to edit for grammar, punctuation, spelling, and other mechanics.

A.2. Oral Communication

Students prepared in oral communication classes will demonstrate effectiveness in the following knowledge and skills identified by the National Communication Association (NCA):

Competency One—Ability to choose and narrow a topic appropriately for the audience and occasion.

Competency Two—Ability to develop a clear thesis statement and organizational pattern appropriate for the topic, audience, and occasion.

Competency Three—Ability to assemble and use effective and sufficient supporting materials, including visual support, appropriate for the audience and occasion.

Competency Four—Ability to use nonverbal behaviors, including eye contact, gestures, and posture and movement, as well as verbal behaviors, including vocal variety in rate, pitch, and intensity to support the message.

Competency Five—Ability to choose, pronounce, and articulate grammatically correct language that is appropriate for the topic, audience, and occasion.

1. Course faculty will report at least 70% of students' presentations rated 6 or higher on each competency using a performance rating scale of Unsatisfactory (0–3), Satisfactory (4–7), and Excellent (8–10).
2. Students who have taken O courses will report that receiving constructive feedback from teachers based on the oral competency assessment instrument and being given the opportunity to perform orally again after constructive feedback enabled them to improve their oral communication.
3. An anonymous assessment team will report that at least 70% of randomly selected student presentations (viewed on videotape) rated 6 or higher on

each competency using a performance rating scale of Unsatisfactory (0–3), Satisfactory (4–7), and Excellent (8–10).

A.3. Writing Intensive Courses

1. Faculty evaluators of student portfolios from W courses will report that at least 90% of students' writing samples meet or exceed the criteria for acceptable writing endorsed by teachers of those courses.

Students who have taken W courses will report the following:

2. That the writing assignments improved their learning of course material.
3. That receiving constructive feedback and being given the opportunity to revise their writing enabled them to improve their writing.
4. That they believe effective writing is important to success in their respective fields.
5. Increased confidence in their ability to meet the professional demands of writing in the workplace.

Teachers will report the following:

6. That writing assignments in W courses improved student learning of course material.
7. That student writing in W courses improved in response to constructive feedback.

B. Computer Skills

The Computer Skills requirement is intended to achieve two goals. The first goal is to prepare students for the use of computer technology in their personal and professional lives. The second goal is to assist the students in developing a set of skills in using the computer in the areas of management and organization of data and the communication of ideas.

Following completion of the Computer Skills general education requirement, students will be competent in the operation of a number of standard computer tools, including word processors, spreadsheets, and communication tools (for example, electronic mail and remote file access). Students will be able to utilize these tools to present information in an organized and effective manner. Students will also be able to interpret and accommodate current capabilities and future advances in computer technology to support their decision making.

C. Mathematical Sciences

An education that reflects only the restricted mathematical needs of the distant past is not adequate for students who will live their professional lives in the twenty-first century. Therefore, the mathematical sciences requirement is designed to achieve the following competency goals:

1. To develop in students a high level of mathematical literacy in order that they be able to adequately cope with the demands of an information-based age. This basic literacy may assume different forms, depending upon students' academic curricula. For example, developing skills in applying the methods of modern data analysis and statistical inference, mastering the more classical deterministic methods of calculus, or (for future teachers of elementary school children) to actively engage fundamental mathematical concepts in the ways that we would have them to teach: to explore, investigate, validate, discuss, represent and construct.

2. To enable students to become confident in their ability to do mathematics and to grasp the implications of the many mathematical concepts that permeate our lives—concepts such as chance, rates of change, logic, and graphs.

3. To develop in students the ability to communicate and to reason mathematically because mathematics today involves much more than calculation. Clarification of the problem, formulating alternatives, developing appropriate tools, and analyzing the consequences are all part of mathematical communication and reasoning.

D. Physical or Biological Science

Science is required of Clemson undergraduates to achieve two goals. The first goal is to expose students to the scientific philosophy that the natural world is mechanistic and largely predictable and can be systematically studied using empirical methods. Mastery of these methods requires particular reasoning skills. Following successful completion of the physical/biological science requirement, students should have an understanding of the relationship among hypotheses, experiments, and theories. They should be able to use the methods of scientific inquiry such as framing a question precisely, developing hypotheses, designing experiments, collecting and analyzing data, drawing conclusions, and making a defensible claim.

The second goal is to familiarize the students with the major principles and theories of a particular science, its historical development, and its significance for a broader world. This knowledge will give students the factual basis needed to practice the scientific method successfully in a particular discipline.

E. Humanities

The humanities is a broad category of study concerned with human nature, thought, emotion, values, interrelations, and culture. Unlike the sciences and the social sciences, the field of humanities is designed principally to insure that all students receive a balance of courses which generally are not applied or performance based. Specifically, the courses which fulfill the humanities general education requirement should build the following competencies: a reflective habit of mind, self and social awareness, a knowledge and appreciation of the development of our culture and those foreign to ours, a heightened aesthetic and ethical sensibility, an understanding of the diverse forms of expression, the ability to think critically, and good communication skills. Humanities courses should develop as many of these competencies as possible.

F. Social Science

The general education social science requirement will introduce students to human social and cultural diversity. The courses will provide students with a deeper understanding of the causes and consequences of human actions. The social science courses will also reinforce communication skills and challenge students to enhance their critical thinking and intellectual development.

MINORS, PROGRAMS, AND DEGREES

Clemson University offers 73 undergraduate degree programs in the Colleges of Agriculture, Forestry, and Life Sciences; Architecture, Arts, and Humanities; Business and Behavioral Science; Engineering and Science; and Health, Education, and Human Development.

MINORS

A minor consists of at least 15 semester credits, with no fewer than nine credits at the 300 level or higher. A student cannot major and minor in the same field or acquire a minor that is not allowed by the degree program. In programs that require a minor, courses may not be used to fulfill both the major and minor requirements. Courses used to fulfill general education requirements, however, may be counted toward the minor. Students are encouraged to contact the department offering the minor for advising. A student may specify one completed minor on the graduation application to be recorded in his/her academic record. Specific requirements are detailed below.

Accounting

A minor in Accounting requires ACCT 201, 204, 311, 312, and nine hours selected from 300- or 400-level accounting courses. Students planning to pursue the Master of Professional Accountancy degree program should select courses in consultation with the school's graduate coordinator.

Adult/Extension Education

A minor in Adult/Extension Education requires AG ED 403, 440, 445, and six additional credits selected from the following: AG ED 407, 428, 450, (ED F, THRD) 482, PRMT 308.

Aerospace Studies

A minor in Aerospace Studies requires A S 109, 110, 209, 210, 309, 310, 409, and 410. Completion of A S Leadership Laboratory and participation in cadet activities are mandatory. Students must compete for an allocation and be accepted into the Professional Officer Course before enrolling in A S 309. (A S 100 and 200 levels may be taken concurrently in the sophomore year.)

African American Studies

A minor in African American Studies requires 15 credits at the 300 and 400 levels as follows:

- Group I—Three credits from A S 301, 498.
- Group II—Three credits from GEOG 330, HIST 338, 339, 438.
- Group III—Three credits from ENGL 462, 483, HIST 311, 312, PO SC 381, SOC 480, THEA 317.
- Group IV—Three credits in any approved course in social sciences.
- Group V—Three credits in any approved course in the humanities.

Courses are to be scheduled in consultation with the appropriate advisors. African American Studies advisors will provide all affected advisors with a list of approved courses prior to registration.

Agricultural Business Management

A minor in Agricultural Business Management requires AP EC 302, 309, 319, and at least two courses selected from AP EC 308, 351, 402, 409, 433, 452, 456, 460.

Agricultural Mechanization and Business

A minor in Agricultural Mechanization and Business requires six credit hours selected from AG M 205, 206, 301, 303; and nine credit hours from AG M 401, 402, 403, 406, 452, 460.

Anthropology

A minor in Anthropology requires ANTH 201 and 15 hours from the following courses: ANTH 301, 320, 351, 403, (JAPN) 417, 495, 498, SOC 433. At least one course must be at the 400 level.

Athletic Leadership

A minor in Athletic Leadership requires 17 credit hours arranged as follows: A L 349, 350, 353, 361, 362, 376, and one of the following: A L 371, 372, 373, 374, 375, 377. Students must complete a coaching internship or athletic administrative internship under the direction of the Athletic Leadership Minor Coordinator.

Beef Cattle Production

A minor in Beef Cattle Production requires AVS 108, 202, 210, 370, 401; and three credits from AVS 310, 353/354, 375, 453, 455, 470.

Biochemistry

A minor in Biochemistry requires BIOCH 301, 423 or 431, 432, 433, 434 (13 credits), plus at least two credits from any other biochemistry courses at the 300 level or above, BIOSC 416, or a section of BIOSC 493 designated as oriented towards biochemistry or molecular biology.

Bioengineering

A minor in Bioengineering requires at least 15 credits and must include BIO E 302, 320, 401. The remaining six credits may be chosen from B E 430, BIO E 201, 420, 450, BIOSC 222, 223, 458, 459, C M E 210, or E M 304, 320, or M E 301.

Biological Sciences

A minor in Biological Sciences requires 15 credits and must include both a lecture and corresponding laboratory in animal diversity (BIOSC 302/306 or 303/307) and a lecture and corresponding laboratory in plant diversity (BIOSC 304/308 or 305/309); remaining credits (minimum of seven) must be selected from BIOCH, BIOSC, or GEN courses numbered 300 or higher.

Business Administration

A minor in Business Administration requires ACCT 201, ECON 211, 212, FIN 306, LAW 322, MGT 301, MKT 301.

Chemistry

A minor in Chemistry requires CH 101, 102, and 15 additional credits in Chemistry, at least nine of which must be at the 300 or 400 level, with the courses selected in consultation with the Department of Chemistry.

Cluster

The Cluster minor allows students a somewhat wider choice of course materials than is possible with the conventional subject-matter minor. The general requirement for the Cluster minor is 15 credits in courses numbered higher than 300, except where noted differently, chosen according to one of the plans listed below. Courses within the student's major area may not be included in the Cluster minor.

- Group I—*Social Sciences*: anthropology, economics, geography, history, political science, psychology, sociology.
- Group II—*Life Sciences*¹: biochemistry, biological sciences, genetics, microbiology.
- Group III—*Physical Sciences*¹: chemistry, geology, physics.
- Group IV—*Engineering*¹: courses in all engineering majors plus engineering mechanics and engineering graphics.

¹No course in the 100 series is acceptable toward the minor and not more than six hours in the 200 series are acceptable.

Communication Studies

A minor in Communication Studies requires COMM 150 and 12 additional credits in communication studies, nine of which must be at the 300-400 level. Three hours at the 400 level must be included.

Communications

A minor in Communications requires 18 credits distributed as follows:

- General Communications Option*—ENGL 231, 312, and either COMM 360 or 361, PHIL 102, and six elective credits.
- Advertising Option*—AP EC 351, ENGL 231 or 304, G C 104, PSYCH 330, and five elective credits.
- Commerce Option*—AP EC 351 or THRD 468, COMM 360 or 361, ENGL 231 or 304, MGT 301, and six elective credits.
- Politics Option*—ENGL 312 and either COMM 360 or 361, P O SC 341, 343, and six elective credits.

Elective credits are approved by the Chair of the Department of English or his/her representative.

Computer Science

A minor in Computer Science requires CP SC 212 and 12 additional credits in computer science of which at least nine credits must be at the 300 level or higher.

Crop and Soil Environmental Science

A minor in Crop and Soil Environmental Science requires AGRIC 104, CSENV 202, and nine or more credits at the 300 level or higher.

Early Intervention

The following coursework is required toward meeting the credentialing standard for Early Intervention: ED EC 336, ED F 334 or PSYCH 340, ED SP 370, 468, HLTH 410, 411, SOC 311. In addition to coursework, students must complete an internship/practicum experience. This internship/practicum will be arranged by the student's home department and must involve work with special needs children ages 0-3. All coursework must be completed before the internship/practicum experience.

East Asian Studies

A minor in East Asian Studies requires 15 credits of which at least six credits must be at the 400 level, distributed as follows: three credits from Group I, six additional credits selected from Group I or from Group II, and six credits from Group III:

Group I—CHIN 418, HIST 334, JAPN (ANTH) 417, PO SC 372.

Group II—HIST 330, 333, PHIL (CHIN) 312, 313, PO SC 472, 477, REL 314, or any other approved courses selected from department list.

Group III—EAS 123, JAPN 401, 499, LANG 401, any Chinese or Japanese language course, or any other approved courses selected from department list.

Courses in Groups II and III must represent a combination of Chinese and Japanese courses.

Economics

A minor in Economics requires ECON 314, 315, and nine additional credits from economics courses numbered 300 or higher.

Education

A minor in Education requires ED 405, ED F 301, 302, 334 or 335, ED SP 370. This minor does not meet the requirements for teacher certification and is not intended for persons who plan to teach in grades K–12.

English

A minor in English requires 15 credits in English above the sophomore level, arranged as follows:

Group I—ENGL 411.

Group II—Three credits from ENGL 405, 406, 407, 408, 409, 410, 412, 413, 414, 415, 416, 417, 418.

Group III—Three credits from ENGL 422, 423, 424, 425.

Group IV—Six additional credits above the sophomore level, including at least three credits from the 400 level.

Department certification of proficiency in composition is required. (See discussion under major concentration in English.)

Entomology

A minor in Entomology requires ENT (BIOSC) 301 and 12 credits in entomology courses at the 300 level or higher.

Entrepreneurship

A minor in Entrepreneurship consists of 15 credits including the following: ACCT 201, ECON (MGT) 306 or 314, and FIN 306. Six credit hours from one of the following tracks are also required: *Planning*—MKT (E L E) 314, MGT (E L E) 315

Experiential—E L E 301, 401

Foundations—ECON (E L E) 321, SOC (E L E) 356

Note: Not open to business majors except BA in Economics.

Environmental Engineering

A minor in Environmental Engineering requires at least 15 credits as follows: EE&S 401 or EN SP 200, at least six credits selected from Group I, and at least three credits from Group II. The remaining three credits may be selected from either group. All courses are to be chosen in consultation with the Department of Environmental Engineering and Science.

Group I—EE&S 402, 410, 411, 430, 484, 485, 486

Group II—B E 322, C E 342, 447, CH 223, 411, 413, CH E 401, 450, EN SP 400, ENTOX 400, (BIOSC, ENT) 430, GEOL 408, MICRO 305, 410

Environmental Science and Policy

A minor in Environmental Science and Policy requires at least 18 credits including EN SP 200, 400, and at least 12 credits from the following:

Group I—Science and Engineering: at least six credits: BIOSC 410, 441, 442, 443, 446, CH 413, CSENV 202, (B E) 408, 475, 490, EE&S 401, 402, 430, 485, ENT 300, ENTOX 400, 421, (BIOSC, ENT) 430, FOR 206, W F B 414.

Group 2—Resource Management: at least two credits: AGRIC (EN SP) 315, B E 364, C M E 323, C R D 357, CSENV 404, EE&S 484, ECON 319, FOR 315, 406, GEOL 300, W F B 306, (BIOSC) 313, 350, 412, 462.

Group 3—Environmental Policy and Social Impacts: at least two credits: AP EC 433, EN SP 471, 472, HIST (F&RR) 392, HLTH 431, PHIL 345, PSYCH 355, R S (SOC) 401, W F B 430.

Film Studies

A minor in Film Studies requires 15 credits in ENGL above the sophomore level, arranged as follows: ENGL 357, 450, 451, 452; and one of the following: ART 313, ENGL 348, 430, 453, 459, 483, or other course as approved by the departmental Director of Undergraduate Studies.

Financial Management

A minor in Financial Management requires FIN 305, 306 or 311, 308, 312, and one of the following: FIN 307, 399, or any 400-level FIN course.

Fine Arts

A minor in Fine Arts requires HUM 301, 302, and 15 credits from the following courses, of which at least nine credits must be earned in courses numbered 300 or higher, and no more than nine credits in any discipline selected from the following: A H (all courses), ART (all courses), COMM 363, 369, ENGL 345, 346, 357, 445, 446, HUM 306, 309, L S 214, MUSIC (all courses), THEA (all courses).

Food Science

A minor in Food Science requires FD SC 214, 401, and eight additional credits in FD SC or NUTR courses numbered 300 or higher.

Forest Products

A minor in Forest Products requires 15 credits which must include at least four courses selected from the following: FOR 341, 400, 441, 442, 444, 447, PKGSC 471. Other courses at the 300 level or above may be selected with a Forest Products advisor's approval.

Forest Resource Management

A minor in Forest Resource Management requires either of the following:

1. FOR 305, 315, 460, and a minimum of six credits, selected with a forestry faculty advisor's approval, from any forestry course (for a total of 16 credits).

2. A formal program of study developed by the student and forestry advisor, containing a minimum of 15 credits of forestry courses. Nine credits must be at the 300 level or higher.

Geography

The Geography minor consists of three credits of geography at the 100 level plus 15 credits of geography at the 300 or 400 level. At least one 400-level geography course must be taken. One of the following courses may be taken as part of the 15-credit, upper-level requirements but may not be substituted for the required 400-level geography course: BIOSC 442, R S (SOC) 471.

Geology

A minor in Geology requires GEOL 101, 102, 103, and 12 additional credits drawn from 300- and 400-level geology courses. At least one 400-level course must be included.

Great Works

The Great Works minor requires G W (ENGL) 301 plus one course from each of the following groups. A minimum of nine credits must be at the 400 level.

Group I—Classical Civilization: Three credits from ENGL 403, 404, (COMM) 491, HIST 354, 355, 450, PHIL 315, PO SC 450.

Group II—Post-classical Literature: Three credits from ENGL 408, 411, 414, 416, FR 400, G W 403, GER 400, SPAN 303, 401.

Group III—Philosophy, Religion, and Social Thought: Three credits from ENGL 350, HIST 471, PHIL 316, 317, PO SC 450, REL 301, 302, 401.

Group IV—The Arts: Three credits from A H 423, 424, HUM 301, 302, MUSIC 415, 416, THEA 315, 316.

Group V—The Sciences: ENGL 434

Health Science

A minor in Health Science requires HLTH 298 plus 12 additional credits drawn from the 300- and 400-level health courses; at least one 400-level course must be included.

History

A minor in History requires 15 credits in history at the 300 and 400 level. Three credits at the 400 level must be included.

Horse Production

A minor in Horse Production requires AVS 202, 204, 370, 412, and six credits selected from AVS 205, 309, 310, 385, 405, 407.

Horticulture

A minor in Horticulture requires HORT 101 and 12 additional credits of horticulture courses (excluding HORT 271, 408, 471), nine credits of which must be at the 300 level or higher.

Human Resource Management

A minor in Human Resource Management requires 18 credits as follows: MGT 301, 307, 310, 400; plus two of the following: MGT 416, 425, 431, 435.

International Engineering and Science

The minor in International Engineering and Science, open to students in any major in the College of Engineering and Science, requires:

1. Completion of a foreign language through at least 202 and
2. Either (a) nine credits of engineering or science courses at the 300 level or higher transferred from a foreign institution during an approved study-abroad program of at least three months, or (b) an approved international internship or research program in engineering or science of at least three months duration, plus nine credits chosen from 300 level or higher foreign language courses: ECON 310, 412, 413; and PO SC 361, 362, 371, 375, 472, 477, 478.

The international study, internship, or research program must be approved in advance by the Associate Dean for Undergraduate Studies of the College of Engineering and Science.

International Politics

A minor in International Politics requires PO SC 102 or 104; 361; and 12 additional credits chosen from the list below. At least three of these credits must be from Group I and at least three credits from Group II:

- Group I—*Comparative Politics*: PO SC 371, 471, 472, 476, 477, 478.
 Group II—*International Politics*: PO SC 362, 363, 367, 428, 457, 465.

With the approval of the Political Science department chair, PO SC 310, 311, 389, 410, and 489 may be applied to the requirements for the International Politics minor. Students majoring in Political Science may not minor in International Politics.

Legal Studies

A minor in Legal Studies requires 15 credits at the 300–400 level, with at least six credits selected from Group I, at least six credits selected from Group II, and the remaining three credits selected from either group at the student's option¹:

- Group I—HIST 328, 329, 496, PHIL 343, PO SC 432, 433, SOC 390.
 Group II—ECON 402, LAW 312, 313, 322, 333, 405, 420, 499.

¹Additional courses may be approved by a committee composed of representatives selected by the Dean of the College of Architecture, Arts, and Humanities and by the Dean of the College of Business and Behavioral Science.

Management

A minor in Management requires 18 credits as follows: MGT 301, 307, 310, 390, 418, 422.

Mathematical Sciences

A minor in Mathematical Sciences requires MTHSC 208 and 12 additional credits from mathematical sciences courses numbered 300 or higher.

Microbiology

A minor in Microbiology requires MICRO 305 and eleven additional credits drawn from 400-level microbiology courses.

Military Leadership

A minor in Military Leadership requires at least 15 credits including M L 301, 302, 401, 402, and one of the following: HIST 390, NURS 305, or PO SC 428. Completion of Leadership Laboratory and participation in calet activities are mandatory. (M L 100 and 200 levels may be taken concurrently in the sophomore year.)

Modern Languages

A minor in Modern Languages requires 15 credits in one modern language from courses at the 300 and 400 levels, including at least one literature course at the 400 level. In French, one of the 300-level courses must be FR 305. FR H438 and H439 and SPAN H438 and H439 may not be used to satisfy requirements for the French or Spanish minor.

Music

A minor in Music requires MUSIC 151, 152, 205, 206, 251, 252; 415 or 416; four semesters of ensemble, totaling four credits, selected from MUSIC 344, 361, 362, 363, 364, 369, 370, 373; and one three-hour 300/400-level music course.

Natural Resource Economics

A minor in Natural Resource Economics requires AP EC 403 and C R D 357 and three courses selected from the following: AP EC 308, 352, 402, (C R D) 412, 433, 452, R S (SOC) 401.

Operations Management

A minor in Operations Management requires 18 credits as follows: MGT 301, 310, 390, 400, 404; plus either MGT 402 or 408.

Packaging Science

A minor in Packaging Science requires 18 credits and must include PKGSC 102, 202, 204, and 206. The remaining nine credits may be selected from FD SC 401, 402, FOR 441, 442, 443, G C 405, 406, PKGSC 368, 401, 404, 454, 464, 466.

Parks, Recreation, and Tourism Management

A minor in Parks, Recreation, and Tourism Management requires one of the following options: *Community Leisure Services*—PRTM 301 (preferred) or 101; PRTM 205, 321, and nine additional credits from PRTM 307, 403, 421, 441.

Non-profit Leadership—CO-OP 101 (PRTM 405 may be substituted), NPL 300, and one course selected from each of the following areas:
 I—COMM 348, 480, PRTM 308
 II—ED F 334, 335, PSYCH 340, SOC 350
 III—HLTH 401, MKT 428, 429, PRTM 421
 IV—MGT 307, PO SC 427, PSYCH 368
 V—HLTH 440, PHIL 344, PO SC 321, PRTM 305, 321

Recreation Resource Management—PRTM 301 (preferred) or 101; PRTM 270, 330, 474, and six additional credits from PRTM 320, 403, 430, 431.

Sport Management—PRTM 301 (preferred) or 101, PRTM 205, 254, 454, and six credits from PRTM 305, 307, 441, 452, 453.

Therapeutic Recreation—PRTM 301 (preferred) or 101; PRTM 311 and 12 additional credits in PRTM, nine of which must be taken from PRTM 318, 412, 413, 417.

Travel and Tourism—PRTM 301 (preferred) or 101; PRTM 342; 12 additional credits from PRTM 343, 344, 349, 445, 446, either (GEOG) 430 or 447.

Philosophy

A minor in Philosophy requires 15 credits in philosophy. These may include one 100-level philosophy course (PHIL 101, 102, or 103). PHIL 401 or 402 must be included.

Physics

A minor in Physics requires PHYS 122, 221, 222, and nine additional credits in physics courses at the 300 level or higher.

Plant Pathology

A minor in Plant Pathology requires PL PA 310 and 12 credits from the following: any 300/400-level PL PA courses, BIOSC 425, 426, GEN (BIOSC, MICRO) 418, I P M 401, MICRO 305.

Political Science

A minor in Political Science requires PO SC 101, 102, or 104 plus 15 additional credits at the 300–400 level, nine of which must be selected from three different fields of political science as follows:
American Government—PO SC 403, 405, 432, 442.
Comparative Politics—PO SC 371, 471, 472, 476, 477, 478.
International Politics—PO SC 361, 362, 363, 428.
Political Theory—PO SC 450, 453.
Public Policy and Public Administration—PO SC 302, 321, 421, 423, 424.

At least one 400-level course must be included. No more than a total of three credits from PO SC 310, 311, and 312 may be applied to the requirements for a Political Science minor.

Poultry Science

A minor in Poultry Science requires AVS 201 and 12 additional credits from AVS 110, 323, 400, 402, 425, 451, 452, 458.

Psychology

A minor in Psychology requires PSYCH 201 and 15 credits from 300- and 400-level psychology courses. At least one 400-level course must be included.

Public Policy

A minor in Public Policy requires PO SC 321, 421, and 430, plus nine credit hours in courses dealing with specific policy domains and approved by the Department of Political Science.

Religion

A minor in Religion requires 15 credits. REL 101 or 102 must be included. (Both may be included.) Nine credits must be at the 300-level or above. REL 401 or 402 must be included. PHIL 303 and PO SC 407 may be included.

Science and Technology in Society

A minor in Science and Technology in Society requires 15 credits, at least six of which must be at the 400 level. See History Department advisor for list of approved courses.

Screenwriting

A minor in Screenwriting requires 15 credits in ENGL above the sophomore level as follows: ENGL 348, 357, 448 (six credits); and one of the following: ENGL 450, 451, 452, 453, THEA 347, or other course as approved by the departmental Director of Undergraduate Studies.

Sociology

A minor in Sociology requires SOC 201 and 15 credits from sociology and rural sociology courses numbered 300 or higher. At least one 400-level course must be included.

Spanish-American Area Studies

A minor in Spanish-American Area Studies requires the equivalent of SPAN 202, plus 15 credits distributed as follows: six credits from HIST 340, 341, 342, 440, GEOG 340; six credits from SPAN 308, 311, (PO SC) 382, 403, 422, 435; and ECON 410.

Textiles

A minor in Textiles requires 15 credits from the following: TEXT 201, 202, 460, and any other approved textile course such as TEXT 308, 314, 416, 426, 428, 440, 470, 471, 472, 475, 476.

Theatre

A minor in Theatre requires 20 credits arranged as follows: three credits of dramatic literature and history (ENGL 404, 410, 411, 412, 430, THEA 347); three credits of theatre history (THEA 315, 316, 317); six credits in a sequence (THEA 278/479, 315/316, 347/447, 372/472, 376/476, 377/477 or 487 or 497); six credits in THEA at the 300–400 level; and two credits of THEA 279.

Turfgrass

A minor in Turfgrass requires CSENV 202, HORT 212, 412, and two of the following: AG M 402, HORT 433, PL PA (ENT) 406.

Urban Forestry

A minor in Urban Forestry requires a minimum of 16 credits, distributed as follows:

Group I—FOR (HORT) 427, 450, 480, HORT 208.

Group II—A minimum of three credits selected from C R P 401, HORT 308.

Group III—A minimum of three credits selected from ENT 401 or HORT 303.

Wildlife and Fisheries Biology

A minor in Wildlife and Fisheries Biology requires W F B 300, 350; six additional hours selected from 300-level or higher W F B courses, except 463 and 490; and three credits selected from AP EC 475, BIOSC 464, 468, 470, 472, 477, ENTOX 400, FOR 415.

Women's Studies

A minor in Women's Studies requires 15 credits at the 300 and 400 level, distributed as follows:

Group I—Six credits: W S 301 and 459 or 498.

Group II—Six credits chosen from core courses: ENGL 380, 436, HIST 318, PSYCH 308, SOC 461, and any additional courses approved for Group II.

Group III—The final three credits may be earned by taking any approved Women's Studies minor course.

Courses selected in Groups II and III must represent at least two disciplines. Courses are to be scheduled in consultation with the appropriate advisors. The Women's Studies advisor will provide all affected advisors with a list of approved courses prior to registration.

Writing

A minor in writing requires 15 credits as follows: *Business and Technical Option*—AP EC 351 or G C 104, CP SC 120, ENGL 304 or 314, 490, 495.

Journalism Option—ENGL 231, 333, 334, 335; one of the following: AP EC 351, COMM 250, CP SC 120, G C 104, ENGL 217, 304, 312, 314, PHIL 102, THRD 468, and any course approved by the Chair of the English Department.

Writing Pedagogy Option—ENGL 312, 400, 401, 485; elective (three credits), any 300- or 400-level writing course offered by the Department of English.

Creative Writing Options

Drama—THEA (ENGL) 347, 447 (six credits), ENGL 430, and one of the following: ENGL 312, 410, 411.

Fiction—ENGL 345, 432, 445 (six credits), and one of the following: ENGL 312, 418, 425, 426.

Poetry—ENGL 346, 446 (six credits), 431, and one of the following: ENGL 312, 413, 416, 417.

PREPROFESSIONAL STUDIES

Clemson University will award the degree of Bachelor of Arts or Bachelor of Science in Preprofessional Studies to a student who is pursuing a degree in a professional school. The student must have also satisfactorily completed three years of undergraduate work in an appropriate curriculum and the first year of work in an accredited medical, dental, veterinary, or other accredited professional school, provided the student fulfills the requirements for the three-year program as follows and the other specified conditions are met.

1. At least two of the three years of preprofessional work, including the third year, must be taken in residence at this University.

2. A minimum of three years of undergraduate work (i.e. preprofessional school credit) must be presented.

3. Normal progress must have been made toward fulfilling the degree requirement of the curriculum in which the student is enrolled at Clemson.

4. The student applying for the Bachelor of Arts or Bachelor of Science in Preprofessional Studies must be recommended by the college at Clemson in which the curriculum that he/she is majoring as

a Clemson student is located or by the college in which three years of normal progress toward a degree can be identified.

5. If the combination of preprofessional work taken and the work in the first year of professional school is equivalent to that which is required in some other bachelor's degree program at Clemson, the college concerned may recommend the other bachelor's degree.

The above requirements and conditions became effective July 1, 1974, and will apply to all students who satisfy these requirements and conditions after that date.

A Clemson student having left the University before receiving the bachelor's degree (prior to July 1, 1974) and having enrolled immediately in an accredited professional postgraduate school may apply for a bachelor's degree from Clemson and have his/her application considered on an individual basis. The college(s) at Clemson considering the application is authorized to examine the student's entire record in both preprofessional and professional studies and exercise its own judgment concerning the three-year requirement for Preprofessional Studies.

SECOND BACCALAUREATE DEGREE

To complete a second baccalaureate degree, a student must complete a minimum of 30 semester hours at Clemson in addition to the greater number of hours required for either degree and satisfy all course and grade requirements for the second degree.

DOUBLE MAJOR

A student in a Bachelor of Arts degree program may be awarded a single baccalaureate degree with a double major. The two majors may be within a single college or may involve two colleges but are limited to Bachelor of Arts degree programs.

GRADUATE DEGREES

Graduate degrees are available from all five colleges in addition to the interdisciplinary programs offering degrees in Digital Production Arts and Policy Studies. Clemson University offers 103 graduate degree programs. The degrees of Doctor of Philosophy, Doctor of Education, Education Specialist, Master of Arts, Master of Science, Master of Agricultural Education, Master of Architecture, Master of Arts in Teaching, Master of Business Administration, Master of Career and Technology Education, Master of City and Regional Planning, Master of Construction Science and Management, Master of Education, Master of Electronic Commerce, Master of Engineering, Master of Fine Arts, Master of Forest Resources, Master of Health Administration, Master of Human Resource Development, Master of Parks, Recreation, and Tourism Management, Master of Professional Accountancy, and Master of Public Administration are awarded to students who satisfactorily complete prescribed graduate programs.

For further information concerning advanced degrees, see the *Graduate Announcements*.

COLLEGE OF AGRICULTURE, FORESTRY, AND LIFE SCIENCES

Additional information on the College of Agriculture, Forestry, and Life Sciences can be found on the Web at virtual.clemson.edu/groups/CAFLS//.

The College of Agriculture, Forestry, and Life Sciences offers a broad range of academic degree programs providing a sound knowledge base and technical expertise in the basic and applied sciences including the life sciences. The Bachelor of Science degree is available in 16 academic programs; the Bachelor of Arts is offered in Biological Sciences.

Preprofessional Health Studies non-degree programs are offered in Premedicine, Prepharmacy, Prehabilitation Sciences, and Preventive Medicine. A bachelor's degree can be obtained by fulfilling additional requirements specified by the University.

The undergraduate academic programs include Agricultural and Applied Economics with concentrations in Agricultural Economics and Community and Economic Development; Agricultural Education; Agricultural Mechanization and Business; Animal and Veterinary Sciences with concentrations in Dairy Business, Equine Business, Food Animal Business, Poultry Business, and Preventive and Science; Biochemistry; Biological Sciences; Biosystems Engineering; Environmental and Natural Resources with concentrations in Conservation Biology, Natural Resource and Economic Policy, and Natural Resources Management; Food Science; Forest Resource Management; Genetics; Horticulture; Microbiology with a Molecular Biology concentration; Packaging Science; Turfgrass; and Wildlife and Fisheries Biology.

Minors

Minors are available to students who wish to broaden their educational background and enhance their expertise. (See page 54 for acceptable minors.)

Scholarships

A range of scholarships is available to students who excel in their academic performance. Information on scholarships and financial aid can be obtained from specific departments in the College or from the Student Financial Aid Office in Sikes Hall.

Student Services

The college has a comprehensive Student Service Center offering a career library, company literature, career search technology, and video/audio resources.

AGRICULTURAL AND APPLIED ECONOMICS

Bachelor of Science

AGRICULTURAL ECONOMICS CONCENTRATION

The Agricultural Economics curriculum emphasizes a strong background in economics with applications to production agriculture, agribusiness, natural resources, and the environment. Courses are also included in basic agricultural and biological sciences, liberal arts, and business.

Employment opportunities for graduates in Agricultural Economics are many and diverse. Private sector opportunities include agricultural production, banking, finance, marketing, and public relations. Public sector opportunities include national/local organizations, government agencies, educational institutions, and cooperative extension services. Graduates have also begun businesses or returned to family-owned businesses. This major also provides an excellent background for professional or graduate study in several disciplines.

Students in the Agricultural Economics curriculum take a basic set of courses during the freshman and sophomore years. During the junior and senior years, students concentrate in one of five emphasis areas: Agricultural Business, Economics, International Trade and Development, Production, and Real Estate. Students should select an emphasis area by the end of the sophomore year.

Freshman Year

First Semester

- 3 - AGRIC 103 Intro. to Animal Industries
- 3 - AGRIC 105 Agriculture and Society
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Science Requirement¹

16

Second Semester

- 3 - AGRIC 104 Introduction to Plant Sciences
- 3 - AP EC 202 Agricultural Economics
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 102 Composition II
- 4 - Science Requirement¹

16

Sophomore Year

First Semester

- 3 - AP EC 302 Economics of Farm Management
- 3 - ECON 212 Principles of Macroeconomics
- 3 - Accounting Requirement²
- 6 - Humanities Requirement E.1 and E.2¹
- 3 - Elective

18

Second Semester

- 3 - AP EC 308 Quantitative Applied Economics
- 3 - AP EC 309 Econ. of Agricultural Marketing
- 3 - EX ST 301 Introductory Statistics
- 3 - Accounting Requirement²
- 3 - Oral Communication Requirement¹
- 3 - Elective

18

Junior Year

First Semester

- 3 - ECON 314 Intermediate Microeconomics
- 3 - EX ST 462 Statistics Applied to Economics
- 3 - R S 301 Rural Sociology or
- 3 - R S (SOC) 459 The Community
- 3 - Emphasis Area³
- 3 - Writing Intensive Requirement¹

15

Second Semester

- 3 - AP EC 420 World Agricultural Trade or
- 3 - AP EC 460 Agricultural Finance
- 3 - ECON 302 Money and Banking or
- 3 - ECON 315 Intermed. Macroeconomics
- 3 - LAW 312 Commercial Law or
- 3 - LAW 322 Legal Environment of Business
- 6 - Emphasis Area³
- 3 - Elective

18

Senior Year

First Semester

- 3 - AP EC 402 Production Economics
- 3 - AP EC (CSENV) 426 Crop. Systems Analysis
- 3 - AP EC 452 Agricultural Policy
- 3 - Emphasis Area³
- 3 - Elective

15

Second Semester

- 3 - AP EC 456 Prices
- 6 - Emphasis Area³
- 6 - Elective

15

131 Total Semester Hours

¹See General Education Requirements.

²ACCT 201 and 202 or 307.

³See advisor. An emphasis area should be selected by the end of the sophomore year in consultation with advisor. Select 18 credits from one of the following:

Agricultural Business—MGT 301, 307, MKT 301, and nine credits from a department approved list.

Economics—ECON 430, MTHSC 207, 210, and nine credits from a department approved list.

International Trade and Development—Six credits of AP EC 490 or two courses of the same foreign language, ECON 310 or 412, and nine credits from a department approved list.

Production—Eighteen credits from a department approved list.

Real Estate—AP EC 313, 413, FIN 307, 417, and six credits from a department approved list.

COMMUNITY AND ECONOMIC DEVELOPMENT CONCENTRATION

The Bachelor of Science program in Community and Economic Development provides career opportunities for social science administration, management, outreach, and research. A Bachelor of Science degree in Agricultural and Applied Economics with a concentration in Community and Economic Development facilitates employment with local, state, regional, federal, and international agencies; research and consulting firms; financial institutions; foundations and councils; public and private utilities; and organizations requiring entrepreneurial skills. This major provides an excellent background for professional and graduate study in several disciplines.

Associations between natural resources and social, economic, and political institutions are investigated. The Community and Economic Development curriculum provides the conceptual, analytical, and pragmatic qualifications to succeed as an economic development specialist. Students receive practical training, and internships are available to complement coursework.

Freshman Year

First Semester

- 3 - AGRIC 105 Agriculture and Society
 - 3 - ENGL 101 Composition I
 - 3 - MTHSC 102 Intro. to Mathematical Analysis
 - 3 - PO SC 102 Intro. to International Relations
 - 4 - Science Requirement¹
- 16

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - GEOG 103 World Regional Geography
 - 3 - Computer Skills Requirement²
 - 4 - Science Requirement¹
- 16

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 3 - AP EC 202 Agricultural Economics *or*
 - 3 - ECON 211 Principles of Microeconomics
 - 3 - EX ST 301 Introductory Statistics
 - 3 - Humanities Requirement E.1²
 - 3 - Oral Communication Requirement²
- 15

Second Semester

- 3 - AP EC 257 Natural Resources, Environment, and Economics
 - 3 - ECON 212 Principles of Macroeconomics
 - 3 - R S 301 Rural Sociology
 - 3 - Writing Intensive Requirement²
 - 4 - Elective
- 16

Junior Year

First Semester

- 3 - AP EC 352 Public Finance
 - 3 - C R D (AP EC, HLTH) 361 Introduction to Health-Care Economics
 - 3 - EX ST 462 Statistics Applied to Economics
 - 5 - Emphasis Area³
 - 3 - Social Science Requirement⁴
- 17

Second Semester

- 3 - C R D 357 Natural Resources Economics
 - 3 - MKT 301 Principles of Marketing
 - 3 - Advanced Social Science Requirement⁴
 - 3 - Emphasis Area³
 - 4 - Elective
- 16

Senior Year

First Semester

- 3 - C R D (AP EC) 411 Regional Impact Analysis
 - 3 - C R P 401 Intro. to City and Regional Plan.
 - 3 - R S (SOC) 471 Demography
 - 3 - Advanced Marketing Requirement⁶
 - 3 - Emphasis Area³
 - 2 - Elective
- 17

Second Semester

- 3 - C R D (AP EC) 412 Regional Economic Development Theory and Policy
 - 3 - C R D (AP EC) 491 Internship, Agribusiness, and Community and Rural Development
 - 3 - R S (SOC) 401 Human Ecology *or*
 - 3 - R S (SOC) 459 The Community
 - 6 - Emphasis Area³
- 15

128 Total Semester Hours

¹A two-semester sequence in the same physical or biological science, each including a laboratory.

²See General Education Requirements.

³See advisor.

⁴Select from 300-level courses in geography, history, political science, psychology, or sociology.

⁵Select from 400-level courses in geography, history, political science, psychology, or sociology.

⁶MKT 314, 423, 427, 428, or 429.

AGRICULTURAL EDUCATION

Bachelor of Science

Agricultural Education provides broad preparation in agricultural sciences and professional education, including communications and human relations skills. In addition to required courses, students may select a minor. (See page 54.)

The Bachelor's degree prepares students for professional education positions in the mainstream of agriculture including teaching, cooperative extension service, and government agricultural agencies. This degree also prepares students for other educational work such as agricultural missionary, public relations, and training officers in agricultural industry.

Freshman Year

First Semester

- 1 - AG ED 102 Agric. Ed. Freshman Seminar
 - 3 - AG ED 200 Agric. Applic. of Microcomputers
 - 4 - BIOL 103 General Biology I
 - 3 - ENGL 101 Composition I
 - 3 - Mathematical Sciences Requirement¹
- 2 - Elective
- 16

Second Semester

- 1 - AG ED 100 Orientation and Field Experience
 - 3 - AG ED 103 Multiculturalism in Agric. Ed.
 - 4 - BIOL 104 General Biology II
 - 3 - ENGL 102 Composition II
 - 3 - Humanities Requirement E.2²
 - 3 - Elective
- 17

Sophomore Year

First Semester

- 3 - AG ED 201 Intro. to Agricultural Education
 - 3 - AP EC 202 Agricultural Economics
 - 4 - CH 101 General Chemistry *or*
 - 4 - CH 105 Beg. Gen. and Organic Chemistry
 - 3 - Oral Communication Requirement²
 - 3 - Elective
- 16

Second Semester

- 1 - AG ED 202 Agric. Ed. Sophomore Seminar
 - 4 - AG ED 203 Teaching Agriscience
 - 3 - AG M 205 Principles of Farm Shop
 - 4 - CH 102 General Chemistry *or*
 - 4 - CH 106 Beg. Gen. and Organic Chemistry
 - 4 - CSENV 202 Soils
 - 3 - HORT 212 Introduction to Turfgrass Culture
- 19

Junior Year

First Semester

- 3 - AG ED 303 Mech. Technology for Agric. Ed.
 - 3 - AG ED 403 Prin. of Adult/Ext. Education *or*
 - 3 - AG ED 440 Program Dev. in Adult/Ext. Ed.
 - 3 - AP EC 302 Economics of Farm Management
 - 4 - AVS 202 Introductory Animal Sciences *or*
 - 3 - PRMT 301 Recreation and Society *or*
 - 3 - W F B 412 Wildlife Management
 - 3 - HORT 303 Plant Materials
- 15-16

Second Semester

- 1 - AG ED 302 Agric. Education Junior Seminar
- 3 - ED F 302 Educational Psychology
- 3 - FOR 305 Woodland Management or
- 3 - FOR 315 Woodland Ecology
- 3 - HORT 208 Landscape Appreciation
- 2 - AG ED 425 Teaching Agricultural Mechanics
- 3 - Mathematical Sciences Requirement¹

16

Senior Year**First Semester**

- 1 - AG ED 400 Supervised Field Experience II
- 3 - AG ED 401 Methods in Agricultural Ed.
- 1 - AG ED 402 Agric. Education Senior Seminar
- 3 - AG ED 404 Biotechnology in Agric. Educ.
- 2 - AG ED 425 Teaching Agricultural Mechanics
- 3 - Writing Intensive Requirement²
- 3 - Elective

16

Second Semester

- 12 - AG ED 406 Directed Teaching or
- 12 - AG ED 407 Internship in Extension and Leadership Education
- 2 - AG ED 423 Curriculum

14

129-130 Total Semester Hours

¹Select from MTHSC 101, 102, 106, 108, 203, 207, EX ST 301. MTHSC 101 and EX ST 301 are recommended.²See General Education Requirements.

AGRICULTURAL MECHANIZATION AND BUSINESS

Bachelor of Science

The Agricultural Mechanization and Business major provides a program for students who desire training in areas relevant to dynamic agricultural enterprise. The program is organized with strength in both business management and technical support of agriculture and agribusiness. To produce well rounded individuals with good communication skills, the curriculum includes courses in the humanities, social sciences, English composition, and public speaking.

Graduates in Agricultural Mechanization and Business find meaningful and remunerative employment in a variety of situations directly and indirectly related to agricultural production, processing, marketing, and the many services connected therewith. Farming and technical sales in the agricultural, industrial, and heavy equipment industries are frequently chosen careers.

By completing this curriculum, graduates will have fulfilled the requirements for an Agricultural Business Management minor. Contact the Enrolled Student Services Office to have the minor recorded.

Freshman Year**First Semester**

- 1 - AG M 101 Introduction to Ag. Mechanization
- 3 - AGRIC 103 Intro. to Animal Industries
- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 3 - Mathematical Sciences Requirement¹

18

Second Semester

- 3 - AGRIC 104 Introduction to Plant Sciences
- 4 - BIOL 104 General Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - Mathematical Sciences Requirement¹

17

Sophomore Year**First Semester**

- 3 - AG M 205 Principles of Farm Shop
- 3 - AP EC 202 Agricultural Economics
- 4 - PHYS 207 General Physics I
- 3 - Computer Skills Requirement²
- 3 - Literature Requirement³

16

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - AG M 206 Agricultural Mechanization
- 3 - AG M 303 Calculations for Mechanized Agric.
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 4 - PHYS 208 General Physics II
- 3 - Social Science Requirement⁴

18

Junior Year**First Semester**

- 3 - AG M 301 Soil and Water Conservation
- 3 - AG M 406 Mechanical and Hydraulic Systems
- 3 - AP EC 302 Economics of Farm Management
- 3 - Minor⁵
- 3 - Social Science Requirement⁴
- 3 - Elective

18

Second Semester

- 3 - AP EC 309 Econ. of Agricultural Marketing
- 3 - COMM 250 Public Speaking
- 4 - CSENV 202 Soils
- 3 - Humanities Requirement E.2²
- 3 - Writing Intensive Requirement²

16

Senior Year**First Semester**

- 3 - AG M 402 Drainage, Irrig. and Waste Mgt.
- 3 - AG M 452 Farm Power
- 3 - AG M 460 Farm and Home Utilities
- 1 - AG M 472 Seminar
- 3 - AP EC 319 Agribusiness Management
- 3 - Minor⁵

16

Second Semester

- 1 - AG M 401 Environmental Control for Plants and Animals
- 2 - AG M 403 Structures for Plants and Animals
- 3 - AG M 408 Equipment Sales and Service
- 3 - Agriculture Requirement¹
- 7 - Elective

16

135 Total Semester Hours

¹A minimum of six credits selected from EX ST 301 or MTHSC 101; MTHSC 102; MTHSC 106.²See General Education Requirements.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210⁴Select from ED F 302, GEOG 101, 301, 302, HIST 101, 102, 172, 173, PO SC 101, PSYCH 201, SOC 201, (R S) 401, or any AP EC or R S courses.⁵Select from Agricultural Business Management minor list.⁶See advisor.

ANIMAL AND VETERINARY SCIENCES

Bachelor of Science

The curriculum in Animal and Veterinary Sciences provides students with a broad base of understanding of scientific principles and the application of these principles to scientific, technical, and business phases of livestock and poultry production, processing, and marketing. Completion of general education requirements, basic sciences, applied sciences, and student-selected courses of personal interest prepares graduates well for successful careers. All students complete a common freshman year; the curriculum is then divided into five concentrations: Dairy Business, Equine Business, Food Animal Business, Poultry Business, and Preventive and Veterinary Science. Each concentration includes specialized courses unique to students pursuing careers in those fields.

Many opportunities are available to Animal and Veterinary Sciences graduates, including production, sales and marketing, business management, advertising, extension, meat and dairy industry, and teaching. Graduates in the Preventive and Veterinary Science Concentration also meet all requirements for admission to graduate and professional schools including the veterinary medicine programs for the University of Georgia and Tuskegee University.

Freshman Year Program**First Semester**

- 1 - AVS 100 Orientation to AVS
- 4 - AVS 202 Introductory Animal Sciences
- 4 - BIOL 103 General Biology I or
- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I

16-17

Second Semester

- 1 - AVS 108 Animal and Dairy Sci. Techniques
- 4 - BIOL 104 General Biology II or
- 5 - BIOL 111 Principles of Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - MTHSC 102 Intro. to Math. Analysis or
- 4 - MTHSC 106 Calculus of One Variable I

15-17

DAIRY BUSINESS CONCENTRATION

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 1 - AVS 203 Dairy Science Techniques
- 4 - CSENV 202 Soils
- 4 - SPAN 101 Elementary Spanish
- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement E.1¹

18

Second Semester

- 3 - AP EC 202 Agricultural Economics
- 3 - AVS 310 Animal Disease and Sanitation
- 3 - COMM 250 Public Speaking
- 4 - SPAN 102 Elementary Spanish
- 1 - Animal Techniques Requirement²
- 3 - Elective

17

Junior Year

First Semester

- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - AP EC 302 Econ. of Farm Management
- 3 - AVS 370 Principles of Animal Nutrition
- 4 - AVS 404 Dairy Cattle Feeding and Mgt.³
- 4 - MICRO 305 General Microbiology

18

Second Semester

- 2 - AVS 302 Principles of Livestock Selection
- 3 - AVS 375 Applied Animal Nutrition
- 2 - AVS 461 Physiology of Lactation
- 3 - CSENV 423 Field Crop—Forages
- 1 - Animal Techniques Requirement²
- 3 - Business Requirement⁴
- 3 - Humanities Requirement E.2¹

1 - Elective

18

Senior Year

First Semester

- 2 - AVS 406 Seminars and Related Topics
- 4 - AVS 430 Dairy Processing I
- 3 - EX ST 301 Introductory Statistics
- 4 - Animal Production Requirement⁴
- 3 - Writing Intensive Requirement¹

16

Second Semester

- 3 - AVS 453 Animal Reproduction
- 3 - AVS 470 Animal Breeding
- 3 - Business Requirement⁴
- 7 - Elective⁶

16

134-137 Total Semester Hours

¹See General Education Requirements.²See advisor. Select from AVS 120, 204, 210.³Taught fall semester of even-numbered years; may be taken in the senior year. See advisor for scheduling alternatives.⁴See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, AP EC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, ECON 211, 212, LAW 312, 313, MGT 301, 307.⁵See advisor. Select from AVS 401, 402, 408, 412, 431. May be taken either first or second semester of senior year.⁶Electives may be taken in the first semester of the senior year if necessary.

EQUINE BUSINESS CONCENTRATION

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - AP EC 202 Agricultural Economics
- 1 - AVS 204 Horse Care Techniques
- 4 - SPAN 101 Elementary Spanish
- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement E.1¹

17

Second Semester

- 3 - AGRIC 104 Intro. to Plant Sciences or
- 4 - CSENV 202 Soils
- 2 - AVS 205 Light Horse Management
- 3 - AVS 310 Animal Disease and Sanitation
- 4 - SPAN 102 Elementary Spanish
- 1 - Animal Techniques Requirement²
- 3 - Humanities Requirement E.2¹
- 1 - Elective

17-18

Junior Year

First Semester

- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - AP EC 302 Econ. of Farm Management
- 3 - AVS 370 Principles of Animal Nutrition
- 3 - EX ST 301 Introductory Statistics
- 1 - Animal Techniques Requirement²
- 3 - Elective

17

Second Semester

- 2 - AVS 302 Principles of Livestock Selection
- 2 - AVS 309 Principles of Equine Evaluation
- 3 - AVS 375 Applied Animal Nutrition
- 2 - AVS 385 Equine Behavior and Training
- 3 - AVS 453 Animal Reproduction
- 3 - COMM 250 Public Speaking
- 3 - CSENV 423 Field Crop—Forages

18

Senior Year

First Semester

- 2 - AVS 406 Seminars and Related Topics
- 3 - AVS 407 Equine Theriogenology
- 4 - Animal Production Requirement⁴
- 3 - Business Requirement⁴
- 3 - Writing Intensive Requirement¹
- 2 - Elective

17

Second Semester

- 4 - AVS 412 Horse Production
- 3 - AVS 470 Animal Breeding
- 3 - MGT 307 Personnel Management
- 3 - Business Requirement⁴
- 4 - Elective³

17

134-138 Total Semester Hours

¹See General Education Requirements.²See advisor. Select from AVS 120, 203, 210.³See advisor. Select from AVS 401, 402, 404, 408.⁴See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, AP EC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, ECON 211, 212, LAW 312, 313, MGT 301.⁵Electives may be taken in the first semester of the senior year if necessary.

FOOD ANIMAL BUSINESS CONCENTRATION

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - AP EC 202 Agricultural Economics
- 1 - AVS 210 Animal Science Techniques
- 4 - SPAN 101 Elementary Spanish
- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement E.1¹

17

Second Semester

- 3 - AVS 310 Animal Disease and Sanitation
- 4 - CSENV 202 Soils
- 3 - EX ST 301 Introductory Statistics
- 4 - SPAN 102 Elementary Spanish
- 1 - Animal Techniques Requirement²
- 3 - Elective³

18

Junior Year

First Semester

- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - AP EC 302 Econ. of Farm Management
- 3 - AVS 370 Principles of Animal Nutrition
- 3 - COMM 250 Public Speaking
- 1 - Animal Techniques Requirement²
- 3 - Elective³

17

Second Semester

- 2 - AVS 302 Principles of Livestock Selection
- 2 - AVS 353 Meats
- 1 - AVS 354 Meats Laboratory
- 3 - AVS 375 Applied Animal Nutrition
- 3 - AVS 453 Animal Reproduction
- 3 - Writing Intensive Requirement¹
- 3 - Elective³

17

Senior Year

First Semester

- 2 - AVS 406 Seminars and Related Topics
- 4 - Animal Production Requirement⁴
- 6 - Business Requirement²
- 3 - Humanities Requirement E.2¹
- 3 - Elective³

18

Second Semester

- 3 - AVS 470 Animal Breeding
- 3 - MGT 307 Personnel Management
- 4 - Animal Production Requirement¹
- 3 - Business Requirement⁵
- 3 - Elective^{1,6}

16

134-137 Total Semester Hours

¹See General Education Requirements.²See advisor. Select from AVS 120, 203, 204.³Students opting to use elective hours to pursue a minor should inform their advisors early in their academic careers.⁴See advisor. Select from AVS 401 or 408; and 402, 404, or 412.⁵See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, APEC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, 423, ECON 211, 212, LAW 312, 313, MGT 301.⁶Electives may be taken in the first semester of the senior year if necessary.

POULTRY BUSINESS CONCENTRATION

Sophomore Year**First Semester**

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - AP EC 202 Agricultural Economics
- 1 - AVS 120 Poultry Techniques
- 4 - SPAN 101 Elementary Spanish
- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement E.1¹

17**Second Semester**

- 3 - AVS 310 Animal Disease and Sanitation
- 2 - AVS 323 Poultry and Poultry Products Eval.
- 3 - EX ST 301 Introductory Statistics
- 4 - SPAN 102 Elementary Spanish
- 1 - Animal Techniques Requirement²
- 3 - Humanities Requirement E.2¹
- 1 - Elective

17**Junior Year****First Semester**

- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - AP EC 302 Econ. of Farm Management
- 3 - AVS 370 Principles of Animal Nutrition
- 3 - AVS 400 Avian Physiology³
- 3 - COMM 250 Public Speaking
- 3 - Business Requirement⁴

18**Second Semester**

- 2 - AVS 302 Principles of Livestock Selection
- 3 - AVS 375 Applied Animal Nutrition
- 3 - AVS 425 Poul. Products Grading and Tech.⁵
- 3 - AVS 453 Animal Reproduction
- 1 - Animal Techniques Requirement²
- 3 - Business Requirement⁴
- 3 - Elective

18**Senior Year****First Semester**

- 2 - AVS 406 Seminars and Related Topics
- 3 - AVS 458 Avian Microbiol. and Parasitology
- 4 - Animal Production Requirement⁴
- 3 - Business Requirement⁴
- 3 - Writing Intensive Requirement¹
- 1 - Elective

16**Second Semester**

- 4 - AVS 402 Poultry Management
- 3 - MGT 307 Personnel Management
- 3 - Business Requirement⁴
- 7 - Elective⁷

17

134-137 Total Semester Hours

¹See General Education Requirements.²See advisor. Select from AVS 203, 204, 210.³Taught fall semester of even-numbered years; may be taken in the senior year. See advisor for scheduling alternatives.⁴See advisor. Select from AG M 205, 401, 402, 403, 460, AGRIC (EN SP) 315, APEC 309, 319, 351, 409, 433, 460, CSENV (B E) 408, ECON 211, 212, LAW 312, 313, MGT 301.⁵Taught in alternate years; may be taken in the senior year. See advisor for scheduling alternatives.⁶Select from AVS 401, 404, 408, 412. Some courses are taught on an alternate semester/year cycle. See advisor for scheduling alternatives.⁷Electives may be taken in the first semester of the senior year if necessary.

PREVETERINARY AND SCIENCE CONCENTRATION

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - PHYS 207 General Physics I
- 1 - Animal Techniques Requirement¹
- 6 - Humanities Requirement E.1 and E.2²
- 3 - Elective³

18**Second Semester**

- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - EX ST 301 Introductory Statistics
- 4 - PHYS 208 General Physics II
- 3 - Computer Skills Requirement²
- 3 - Social Science Requirement²

17**Junior Year****First Semester**

- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
- 3 - AP EC 202 Agricultural Economics
- 3 - AVS 370 Principles of Animal Nutrition
- 3 - BIOCH 301 Molecular Biochemistry
- 3 - GEN 302 Molecular and General Genetics
- 1 - GEN 303 Introductory Genetics Lab.
- 1 - Animal Techniques Requirement¹

18**Second Semester**

- 3 - AVS 310 Animal Disease and Sanitation
- 3 - AVS 375 Applied Animal Nutrition
- 3 - AVS 453 Animal Reproduction
- 3 - COMM 250 Public Speaking
- 4 - MICRO 305 General Microbiology
- 1 - Animal Techniques Requirement¹

17**Senior Year****First Semester**

- 2 - AVS 406 Seminars and Related Topics
- 4 - Animal Production Requirement⁴
- 3-4 - Animal Products Requirement⁵
- 8 - Elective¹

17-18**Second Semester**

- 3 - AVS 470 Animal Breeding
- 3 - Writing Intensive Requirement¹
- 10 - Elective^{1,6}

16

134-138 Total Semester Hours

¹See advisor. Select from AVS 120, 203, 204, 210.²See General Education Requirements.³Students opting to use elective hours to pursue a minor should inform their advisors early in their academic careers.⁴Select from AVS 401, 402, 404, 408, 412. Some courses are taught on an alternate semester/year cycle. See advisor for scheduling alternatives. Tuskegee University Veterinary School requires three credits of poultry science.⁵See advisor. Select from AVS 353/354, 425, 430. Some courses are taught on an alternate semester/year cycle. See advisor for scheduling alternatives.⁶Electives may be taken in the first semester of the senior year if necessary.**BIOCHEMISTRY****Bachelor of Science**

Biochemistry is the study of the molecular basis of life. To comprehend current biochemical information and make future contributions to our molecular understanding of life processes, students must obtain a broad background in biology and a firm foundation in chemistry, mathematics, and physics. This is the basis of the biochemistry curriculum.

The program provides an excellent educational background for professional school (medicine, dentistry, or veterinary medicine) and graduate school in biochemistry, molecular biology, or another biological science discipline. Graduates will find employment opportunities in the research and service programs of universities, medical schools, hospitals, research institutes, and industrial and government laboratories.

Freshman Year**First Semester**

- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I

16

Second Semester

- 5 - BIOL 111 Principles of Biology II
 - 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 4 - MTHSC 108 Calculus of One Variable II
-
- 16

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry
 - 1 - CH 227 Organic Chemistry Lab.¹
 - 3 - GEN 302 Molecular and General Genetics
 - 1 - GEN 303 Introductory Genetics Lab.
 - 3 - PHYS 122 Physics with Calculus I
 - 1 - PHYS 124 Physics Lab. I
 - 3-4 Advanced Mathematics Requirement²
-
- 15-16

Second Semester

- 3 - BIOCH 301 Molecular Biochemistry
 - 3 - CH 224 Organic Chemistry
 - 1 - CH 228 Organic Chemistry Lab.¹
 - 3 - PHYS 221 Physics with Calculus II
 - 1 - PHYS 223 Physics Lab. II
 - 3 - Humanities Requirement E.1³
 - 3 - Social Science Requirement⁴
-
- 17

Junior Year

First Semester

- 3 - BIOCH 431 Physical Approach to Biochem.
 - 2 - BIOCH 433 General Biochemistry Lab. I
 - 3 - CH 330 Introduction to Physical Chemistry⁴
 - 3 - ENGL 314 Technical Writing
 - 3 - Approved Requirement⁵
 - 3 - Computer Skills Requirement¹
-
- 17

Second Semester

- 3 - BIOCH 432 Biochemistry of Metabolism
 - 2 - BIOCH 434 General Biochemistry Lab. II
 - 2 - BIOCH 436 Nucleic Acid and Protein Biosyn.
 - 3 - Approved Requirement⁵
 - 3 - Humanities Requirement E.2³
 - 3 - Social Science Requirement⁴
-
- 16

Senior Year

First Semester

- 2 - BIOCH 491 Special Problems in Biochemistry⁶
 - 3 - BIOSC 461 Cell Biology
 - 3 - CH 313 Quantitative Analysis
 - 3 - COMM 250 Public Speaking
 - 1-2 - Advanced Laboratory Requirement⁷
 - 4 - Elective
-
- 16-17

Second Semester

- 2 - BIOCH 491 Special Problems in Biochemistry⁶
 - 2 - BIOCH (GEN) 493 Senior Seminar
 - 4 - Science Requirement⁸
 - 7 - Elective
-
- 16

129-131 Total Semester Hours

¹CH 225 may substitute for CH 227, and CH 226 may substitute for CH 228. In both cases, the additional hour of credit counts toward a science requirement.

²EX ST 301, MTHSC 206, 301, or 302.

³See General Education Requirements.

⁴CH 331 may be substituted.

⁵A one-year sequence in a foreign language (strongly recommended) or any humanities or social science courses listed in section E.2 or F of the General Education Requirements.

⁶To be taken over two semesters with the same faculty member.

⁷BIOSC 462 or CH 317.

⁸Select from courses in BIOSC, CH, CP, SC, GEN, MTHSC, MICRO, PHYS, PL PA, or as approved by advisor in consultation with the biochemistry faculty.

BIOLOGICAL SCIENCES

Bachelor of Science

Biology encompasses the broad spectrum of the modern life sciences, including the study of all aspects of life from the structure and function of the whole organism down to the subcellular levels and up through the interactions of organisms to the integrated existence of life on the entire planet. Descriptive, structural, functional, and evolutionary questions are explored through the hierarchy of the organization of life. Applications of current advances to the health and well-being of man and society, to nature and the continuation of earth as a balanced ecosystem, and to an appreciation of the place of natural science in our cultural heritage receive emphasis.

Majors in Biological Sciences receive classroom, laboratory, and field training in biology with an emphasis on chemistry, mathematics, and physics as necessary tools. The Bachelor of Science in Biological Sciences curriculum prepares students for graduate study in any of the life science areas (such as agricultural sciences, biochemistry, botany, cell and molecular biology, conservation, ecology and environmental science, entomology, forestry, genetics, industrial and regulatory biology, microbiology, morphology, physiology, wildlife biology, and zoology; for the health professions (medicine, dentistry, etc.), veterinary medicine; and for science teaching.

Entomology Emphasis Area

Bachelor of Science students who wish to specialize in entomology may elect this emphasis area. Requirements are as follows: ENT (BIOSC) 400, ENT (BIOSC) 415, and seven additional credits selected from ENT 300, 308, 401, 404, 407, ENT (BIOSC) 436, ENT (BIOSC) 455, ENT (BIOSC, W F B) 469, 490, ENT (GEN) 495, PL PA (ENT) 406.

Freshman Year

First Semester

- 5 - BIOL 110 Principles of Biology I¹
 - 1 - BIOSC 101 Frontiers in Biology I²
 - 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 4 - MTHSC 106 Calculus of One Variable I
-
- 17

Second Semester

- 5 - BIOL 111 Principles of Biology II¹
 - 1 - BIOSC 102 Frontiers in Biology II²
 - 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 4 - MTHSC 108 Calculus of One Variable II
-
- 17

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry
 - 1 - CH 227 Organic Chemistry Lab.
 - 3 - CP SC 120 Intro. to Information Technology
 - 4 - Animal Diversity Requirement¹
 - 3 - Humanities Requirement E.1³
 - 3 - Elective
-
- 17

Second Semester

- 3 - CH 224 Organic Chemistry²
 - 3 - GEN 302 Molecular and General Genetics
 - 1 - GEN 303 Introductory Genetics Lab.
 - 4 - Plant Diversity Requirement⁶
 - 3 - Social Science Requirement⁴
 - 3 - Elective
-
- 17

Junior Year

First Semester

- 3 - BIOCH 301 Molecular Biochemistry
 - 1 - BIOCH 302 Molecular Biochemistry Lab.⁵
 - 3 - BIOSC 335 Evolutionary Biology
 - 3 - ENGL 314 Technical Writing
 - 4 - PHYS 207 General Physics I or
 - 3 - PHYS 122 Physics with Calculus I and
 - 1 - PHYS 124 Physics Lab. I⁷
 - 3 - Social Science Requirement⁴
-
- 17

Second Semester

- 3 - COMM 250 Public Speaking
 - 3 - PHIL 325 Philosophy of Science or
 - 3 - PHIL 326 Science and Values
 - 4 - PHYS 208 General Physics II or
 - 3 - PHYS 221 Physics with Calculus II and
 - 1 - PHYS 223 Physics Lab. II
 - 3 - Major Requirement⁸
 - 3 - Elective
-
- 16

Senior Year

First Semester

- 2 - BIOSC 493 Senior Seminar⁹
 - 12 - Major Requirement⁸
 - 3 - Elective
-
- 17

Second Semester

- 14 - Major Requirement⁸
 - 3 - Elective
-
- 17

135 Total Semester Hours

¹BIOL 110 and 111 are strongly recommended; however, BIOL 103 may substitute for BIOL 110, and BIOL 104 may substitute for BIOL 111. The remaining 1-2 credits required must be satisfied by completing 1-2 extra credits from departmental course offerings at the 300 level or above; see advisor.

²If not completed in the freshman year, the required 1-2 credits must be satisfied by completing 1-2 extra credits from departmental course offerings at the 300 level or above; see advisor.

³Select from BIOSC 302/306, 303/307, or ENT (BIOSC) 301. Entomology Emphasis Area students must satisfy the Animal Diversity Requirement with ENT (BIOSC) 301.

⁴See General Education Requirements.

*CH 228 may be substituted for BIOCH 302

*BIOSC 304/308 or BIOSC 305/309.

Physics with calculus is a three-semester sequence. Students selecting this option may wish to take PHYS 222/224 in the senior year to complete the sequence.

*See advisor. At least one lecture course must be taken from each of the following areas: Ecology, Cell Biology, Physiology. Six credits of lab are required and must include a lab from each of two of the three core areas (Ecology, Cell Biology, and Physiology) to match the major core lecture course taken. The remaining courses may be selected from BIOCH 302, MICRO 305, or any BIOSC, BOT, or ZOOL course at the 300 level or above. *Note:* It is recommended that Entomology emphasis area students take BIOSC 475 to satisfy the physiology requirement and BIOSC 476 to satisfy one of the core lab requirements.

*Entomology emphasis area students are advised to take ENT 461 and 462 in lieu of BIOSC 493.

BIOLOGICAL SCIENCES

Bachelor of Arts

The Bachelor of Arts in Biological Sciences provides a strong foundation in biology and is ideal for students desiring a liberal education emphasizing an interdisciplinary approach to a thorough understanding of the life sciences.

Freshman Year

First Semester

- 5 - BIOL 110 Principles of Biology I¹
- 1 - BIOSC 101 Frontiers in Biology I²
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - Foreign Language Requirement³

17

Second Semester

- 5 - BIOL 111 Principles of Biology II¹
- 1 - BIOSC 102 Frontiers in Biology II²
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 4 - Foreign Language Requirement³

17

Sophomore Year

First Semester

- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Animal or Plant Diversity Requirement⁴
- 3 - Foreign Language Requirement³
- 3 - Literature Requirement⁵

17

Second Semester

- 3 - CP SC 120 Intro. to Information Technology
- 3 - GEN 302 Molecular and General Genetics
- 1 - GEN 303 Introductory Genetics Lab.
- 4 - MTHSC 108 Calculus of One Variable II or 3 - MTHSC 301 Stat. Theory and Meth. I
- 3 - Foreign Language Requirement³
- 3 - Literature Requirement⁵

16-17

Junior Year

First Semester

- 3 - BIOCH 305 Essential Elements of Biochemistry
- 1 - BIOCH 306 Essential Elements of Bioch. Lab.
- 3 - BIOSC 335 Evolutionary Biology
- 3 - ENGL 314 Technical Writing
- 4 - PHYS 207 General Physics I
- 3 - Minor⁶

17

Second Semester

- 3 - COMM 250 Public Speaking
- 3 - HIST 173 Western Civilization
- 3 - PHIL 325 Philosophy of Science or 3 - PHIL 326 Science and Values
- 4 - PHYS 208 General Physics II
- 4 - Animal or Plant Diversity Requirement⁴

17

Senior Year

First Semester

- 2 - BIOSC 493 Senior Seminar
- 3 - Major Requirement⁷
- 6 - Minor⁶
- 6-5 - Elective

17-16

Second Semester

- 6 - Major Requirement⁷
- 6 - Minor⁶
- 4 - Elective

16

134 Total Semester Hours

¹BIOL 110 and 111 are strongly recommended; however, BIOL 103 may substitute for BIOL 110, and BIOL 104 may substitute for BIOL 111. The remaining 1-2 credits required must be satisfied by completing 1-2 extra credits from departmental course offerings at the 300 level or above; see advisor.

²If not completed in the freshman year, the required 1-2 credits must be satisfied by completing 1-2 extra credits from departmental course offerings at the 300 level or above; see advisor.

³Four semesters of the same language are required.

⁴At least one lecture course and associated laboratory must be completed for both Animal Diversity (BIOSC 302 plus 306 or BIOSC 303 plus 307) and for Plant Diversity (BIOSC 304 plus 308 or BIOSC 305 plus 309).

⁵Select from sophomore literature courses (200-level only) or foreign language literature (300-level or higher).

⁶See pages 35-38.

⁷At least one lecture course must be taken from each of the following areas: Ecology, Cell Biology, Physiology.

BIOSYSTEMS ENGINEERING

Bachelor of Science

The Biosystems Engineering program is administered jointly by the College of Agriculture, Forestry, and Life Sciences and the College of Engineering and Science. See page 78 for the curriculum.

ENVIRONMENTAL AND NATURAL RESOURCES

Bachelor of Science

The Environmental and Natural Resources curriculum produces professionals who have a broad-based knowledge in natural resources and an ability to interact with other resource professionals to provide thoughtful solutions to environmental and natural resource problems. The world is blessed with an abundance of natural resources, but the problems associated with their conservation are immense. Protection of rare and endangered species, preventing and controlling invasions of exotics, protecting old growth forests, restoring degraded ecosystems, and balancing the resource demands of industry and the public are some of the environmental issues which are enmeshed in politicized environments.

Three concentrations are offered within the Environmental and Natural Resources major. The Conservation Biology concentration is oriented toward students who desire a greater exposure to taxa, their habitats and their interrelationships. The Natural Resource and Economic Policy concentration provides more in-depth study in economics and policy applications. The Natural Resources Management concentration emphasizes both resource management and negotiation skills.

Graduates in Environmental and Natural Resources are well-prepared for further graduate studies in natural resources and related fields. Potential public sector employers of graduates include federal, state, and municipal resource management agencies, private industries impacting land and water resources, environmental management consulting firms, and various environmental advocacy groups.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 1 - E N R 101 Introduction to Environmental and Natural Resources I
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis

15

Second Semester

- 4 - BIOL 104 General Biology II
- 4 - CH 102 General Chemistry
- 1 - E N R 102 Introduction to Environmental and Natural Resources II
- 3 - ENGL 102 Composition II
- 3 - Elective

15

CONSERVATION BIOLOGY CONCENTRATION

Sophomore Year

First Semester

- 3 - AP EC 257 Natural Resources, Environment, and Economics
 - 3 - COMM 250 Public Speaking
 - 3 - W F B (BIOSC) 313 Conservation Biology
 - 3 - Computer Skills Requirement¹
 - 3 - Humanities Requirement E.1¹
 - 3 - Elective
-
- 18

Second Semester

- 3 - EX ST 301 Introductory Statistics
 - 3 - GEN 302 Molecular and General Genetics
 - 1 - GEN 303 Introductory Genetics Lab.
 - 3-4 - Physical Environment Requirement²
 - 3-4 - Taxonomy/Habitat Requirement³
 - 3 - Elective
-
- 16-18

Junior Year

First Semester

- 3 - ENGL 314 Technical Writing
 - 3 - Ecology Requirement⁴
 - 3 - Humanities Requirement E.2¹
 - 3-4 - Physiology Requirement⁵
 - 3-4 - Taxonomy/Habitat Requirement³
-
- 15-17

Second Semester

- 3 - BIOSC 335 Evolutionary Biology
 - 3 - E N R 302 Natural Resources Measurements
 - 3 - Ecology Requirement⁴
 - 3 - Natural Resource Economics Requirement⁶
 - 3-4 - Taxonomy/Habitat Requirement³
-
- 15-16

Senior Year

First Semester

- 3 - C R P (E N R) 434 Geographic Information Systems for Landscape Planning
 - 3 - E N R (BIOSC) 413 Restoration Ecology
 - 3 - Conservation Colloquium⁷
 - 2-3 - Conservation Policy/Law Requirement⁸
 - 3-4 - Taxonomy/Habitat Requirement³
-
- 14-16

Second Semester

- 3 - E N R 450 Conservation Issues
 - 6-8 - Taxonomy/Habitat Requirement³
 - 3 - Social Sciences Requirement¹
 - 3 - Elective
-
- 15-17

125-132 Total Semester Hours

¹See General Education Requirements.

²GEOG 106, GEOL 101, CSENV 202, or PHYS 240.

³Select from AG M 301, BIOSC 302/306, 303/307, 304/308, 305/309, 320, 406/407, 410/411, 442, 464, 468, 472, 477, CSENV 404, ENT (BIOSC) 301, ENT (BIOSC) 415, (W F B) 469, FOR 205, 251, 406, GEOL 112, 210, 403, MICRO 403, W F B 418, 440, 462. At least four of the courses must be laboratory or courses with a required laboratory component.

⁴BIOSC 441, 442, 443, 446, or 470.

⁵AN PH 301, BIOSC 401/402, 458, 475, or BIOSC (AVS) 480.

⁶AP EC 433, 475, C R D 357, or FOR 304.

⁷AP EC 490, BIOSC 491, ENT 490, FOR 419, or W F B 493.

⁸EN SP 472, FOR 400, 406, or W F B 430.

Notes:

1. Students planning to attend graduate school are strongly encouraged to take organic chemistry after completing CH 101/102.
2. Students planning to attend graduate school are strongly encouraged to substitute MTHSC 106/108 or 106/207 for MTHSC 102 and EX ST 301.

NATURAL RESOURCE AND ECONOMIC POLICY CONCENTRATION

Sophomore Year

First Semester

- 3 - AP EC 257 Natural Resources, Environment, and Economics
 - 3 - ECON 212 Principles of Macroeconomics
 - 3 - W F B (BIOSC) 313 Conservation Biology or 3 - Minor¹
 - 3 - Computer Skills Requirement²
 - 3 - Humanities Requirement E.1²
 - 3 - Oral Communication Requirement²
-
- 18

Second Semester

- 3 - C R D 357 Natural Resources Economics
 - 3 - ECON 314 Intermediate Microeconomics
 - 3 - EX ST 301 Introductory Statistics
 - 3 - GEOG 103 World Regional Geography
 - 3 - Ecology Requirement³ or 3 - Minor¹
 - 3 - Elective
-
- 18

Junior Year

First Semester

- 3 - ECON 319 Environmental Economics
 - 3 - GEOL 300 Environmental Geology
 - 2-5 - Ecology Requirement¹ or 3 - Minor¹
 - 3 - Humanities Requirement E.2²
 - 3 - Political Science Requirement⁴
-
- 14-17

Second Semester

- 3 - AP EC 403 Land Economics or 3 - AP EC 420 World Agricultural Trade
 - 3 - AP EC 456 Prices
 - 3 - AP EC 475 Econ. of Wildlife Mgt. and Policy
 - 3 - C R D (AP EC) 412 Spatial Competition and Rural Development
 - 3 - Writing Intensive Requirement⁵
-
- 15

Senior Year

First Semester

- 3 - AP EC 402 Production Economics
 - 3 - C R D (AP EC) 411 Regional Impact Analysis
 - 3 - ECON 315 Intermediate Macroeconomics
 - 3 - R S (SOC) 401 Human Ecology
 - 3 - Conservation Colloquium¹
-
- 15

Second Semester

- 3 - AP EC 452 Agricultural Policy
 - 3 - C R P (E N R) 434 Geographic Information Systems for Landscape Planning or 3 - Minor¹
 - 3 - E N R 450 Conservation Issues
 - 7 - Elective or 4 - Elective and 3 - Minor¹
-
- 16

126-129 Total Semester Hours

¹Minor is optional but must be selected from the following: Biochemistry, Biological Sciences; Chemistry; Crop and Soil Environmental Science; Environmental Science and Policy; Forest Resource Management; Geography; Horticulture; Legal Studies; Microbiology; Parks, Recreation, and Tourism Management; Urban Forestry; Wildlife and Fisheries Biology. Courses may not be used to fulfill both major and minor requirements.

²See General Education Requirements.

³Select at least three credits from BIOSC 441, CSENV 202, EN SP 200, FOR 206, 315, W F B 350, 412. Remaining credits may be selected from AG M 301, BIOSC 302/306, 303/307, 304/308, 305/309, 320, 406/407, 410/411, 464, 468, 472, 477, CSENV 404, ENT (BIOSC) 301, ENT (BIOSC) 415, ENT (BIOSC, W F B) 469, FOR 205, 251, MICRO 403, W F B 418, 440.

⁴PO SC 302, 421, 430, 432, or 433.

⁵AP EC 490, BIOSC 491, ENT 490, FOR 419, or W F B 493.

NATURAL RESOURCES MANAGEMENT CONCENTRATION

Sophomore Year

First Semester

- 3 - AP EC 257 Natural Resources, Environment, and Economics
 - 4 - CSENV 202 Soils
 - 3 - FOR 205 Dendrology
 - 3 - W F B (BIOSC) 313 Conservation Biology
 - 3 - Computer Skills Requirement¹
-
- 16

Second Semester

- 3 - COMM 250 Public Speaking
 - 3 - FOR 206 Forest Ecology
 - 4 - PHYS 200 Introductory Physics
 - 3 - Humanities Requirement E.2¹
 - 3 - Literature Requirement²
-
- 16

Junior Year

First Semester

- 4 - BIOSC 320 Field Botany or 3 - BIOSC 406 Intro. Plant Taxonomy and 1 - BIOSC 407 Plant Taxonomy Lab.
 - 3 - C R D 357 Natural Resources Economics
 - 3 - EX ST 301 Introductory Statistics
 - 3 - GEOL 101 Physical Geology
 - 1 - GEOL 103 Physical Geology Lab.
 - 3 - Minor¹
-
- 17

Second Semester

- 3 - E N R 302 Natural Resources Measurements
- 3 - ENGL 314 Technical Writing
- 3 - W F B 350 Principles of Fish and Wildlife Biol.
- 3 - Minor¹
- 3 - Elective

15

Senior Year**First Semester**

- 2 - FOR (E N R) 416 Forest Policy and Admin.
- 3 - W F B 462 Wetland Wildlife Biology
- 3 - Conservation Colloquium⁴
- 6 - Minor¹
- 4 - Elective

18

Second Semester

- 3 - C R P (E N R) 434 Geographic Information Systems for Landscape Planning
- 3 - E N R 450 Conservation Issues
- 3 - FOR 400 Public Relations in Natural Res.
- 2 - FOR 406 Forested Watershed Management
- 3 - W F B 418 Fishery Conservation
- 3 - Minor¹

17

129 Total Semester Hours

¹See General Education Requirements.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

³A minor is required and must be selected from the following: Biochemistry; Biological Sciences; Chemistry; Crop and Soil Environmental Science; Environmental Science and Policy; Forest Resource Management; Geology; Horticulture; Legal Studies; Microbiology; Natural Resource Economics; Parks, Recreation, and Tourism Management; Urban Forestry; Wildlife and Fisheries Biology. Courses may not be used to fulfill both major and minor requirements.

⁴AP EC 490, BIOSC 491, ENT 490, FOR 419, or W F B 493.**FOOD SCIENCE****Bachelor of Science**

Food Science majors apply principles of basic and applied sciences to the creation, production, processing, evaluation, packaging, distribution, and utilization of safe, nutritious, and enjoyable foods and food products. The safety of foods during processing and preservation, the provision of foods with adequate nutritional value, adherence to dietary recommendations, and the conservation of resources are important consumer issues addressed by food scientists.

The curriculum allows flexibility for concentrating in one of two areas. In the Food Science and Technology concentration, students may emphasize business, engineering, food packaging, additional sciences, or other areas that complement requirements of the Institute of Food Technologists. The Nutrition and Dietetics concentration emphasizes nutrition and related areas. It is currently granted approval status by the Commission on Accreditation for Dietetics Education of the American Dietetic Association, 216 West Jackson Blvd., Chicago, IL 60606-6995.

Food processing industries, ingredient manufacturers, and packaging suppliers employ Food Science graduates in food product development, quality assurance, production, management, and business and technical sales. State and federal agencies also need graduates for food safety and regulatory positions. With the Nutrition and Dietetics concentration, employment opportunities include dietitians, nutritionists, consultants, and food specialists. Graduates in Food Science are also well prepared to pursue graduate study in many areas.

The Department of Food Science and Human Nutrition allows students to count up to twelve hours of graduate credit toward both the Bachelor of Science degree in Food Science and Master of Science degree in Food, Nutrition, and Culinary Sciences. Students participating in this program must have completed the junior year, must have earned a minimum 3.4 grade-point ratio, and must be admitted to the Graduate School prior to registering for graduate courses. Details of the suggested curriculum and program information are available from the Department of Food Science and Human Nutrition.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I or
- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 1 - FD SC 101 Epochs in Man's Struggle for Food
- 3-4 - Mathematical Sciences Requirement¹

15-17

Second Semester

- 4 - BIOL 104 General Biology II or
- 5 - BIOL 111 Principles of Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 2 - FD SC 102 Perspectives in Food and Nutrition Science
- 3 - Computer Skills Requirement²

16-17

Sophomore Year**First Semester**

- 4 - CH 201 Survey of Organic Chemistry or
- 3 - CH 223 Organic Chemistry and
- 1 - CH 227 Organic Chemistry Lab.
- 3 - PHYS 122 Physics with Calculus I or
- 4 - PHYS 200 Introductory Physics or
- 4 - PHYS 207 General Physics I
- 3 - Humanities Requirement E.1²
- 3 - Social Science Requirement²
- 2 - Elective

15-16

Second Semester

- 3 - BIOCH 305 Essential Elements of Biochemistry
- 1 - BIOCH 306 Essential Elements of Bioch. Lab.
- 3 - FD SC 214 Food Resources and Preservation
- 3 - Oral Communication Requirement¹
- 3 - Social Science Requirement²
- 3 - Elective

16

FOOD SCIENCE AND TECHNOLOGY CONCENTRATION**Junior Year****First Semester**

- 3 - FD SC 306 Food Service Operations
- 3 - FD SC 404 Food Preservation and Processing
- 2 - FD SC 407 Quantity Food Production
- 3 - NUTR 451 Human Nutrition
- 3 - Emphasis Area⁴
- 3 - Elective

17

Second Semester

- 3 - EX ST 301 Introductory Statistics
- 4 - FD SC 408 Food Process Engineering
- 4 - MICRO 407 Food and Dairy Microbiology
- 3 - Writing Intensive Requirement¹
- 3-4 - Elective

17-18

Senior Year**First Semester**

- 4 - FD SC 401 Food Chemistry I
- 1 - FD SC 417 Seminar
- 4 - MICRO 305 General Microbiology
- 3 - Humanities Requirement E.2²
- 5 - Emphasis Area⁴
- 1 - Elective

18

Second Semester

- 4 - FD SC 402 Food Chemistry II
- 3 - FD SC 409 Total Quality Management for the Food and Packaging Industries
- 1 - FD SC 418 Seminar
- 4 - Department Requirement⁶
- 4 - Emphasis Area⁴

16

130-135 Total Semester Hours

NUTRITION AND DIETETICS CONCENTRATION**Junior Year****First Semester**

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - FD SC 306 Food Service Operations
- 3 - FD SC 404 Food Preservation and Processing
- 2 - FD SC 407 Quantity Food Production
- 3 - NUTR 451 Human Nutrition
- 3 - Humanities Requirement E.2²

18

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - EX ST 301 Introductory Statistics
- 3 - NUTR 455 Nutrition and Metabolism
- 3 - Writing Intensive Requirement¹
- 3 - Elective

16

Senior Year**First Semester**

- 4 - FD SC 401 Food Chemistry I
- 2 - FD SC 491 Practicum
- 4 - MICRO 305 General Microbiology
- 4 - NUTR 424 Medical Nutrition Therapy I
- 2-3 Elective

16-17

Second Semester

- 4 - FD SC 402 Food Chemistry II
- 3 - FD SC 409 Total Quality Management for the Food and Packaging Industries
- 4 - MICRO 407 Food and Dairy Microbiology
- 4 - NUTR 425 Medical Nutrition Therapy II
- 3 - NUTR 426 Community Nutrition

18

130-135 Total Semester Hours

¹MTHSC 102 or 106.²See General Education Requirements.³COMM 150 or 250.⁴See advisor.⁵ENGL 304 or 314.⁶FD SC 421, 491, or PKGSC 464/466.**FOREST RESOURCE MANAGEMENT****Bachelor of Science**

The Forest Resource Management curriculum combines a broad education in the arts and sciences with applied forest sciences. This combination provides the necessary foundation for the scientific management of forest resources, products, and services.

Foresters are qualified for a broad spectrum of employment opportunities in the public and private sectors. They may be engaged as managers, administrators, or owners of forest lands or forest-based businesses; as technical specialists in the production of timber, useable water, wildlife, and aesthetic values, and in the recreational use of the forest; or as professionals in other areas where the conservation of natural resources is a concern. Foresters earning advanced degrees find employment in academic work and in research conducted by public and private agencies.

The curriculum, accredited by the Society of American Foresters, provides a strong program in the basic knowledge and skills required of a professional forester. Forest Resource Management majors will select a minor. (See page 54.) The curriculum also provides the necessary prerequisites for graduate study. The Department of Forestry and Natural Resources offers graduate programs leading to the Master of Science, Master of Forest Resources, and Doctor of Philosophy degrees.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 105 Beg. General and Organic Chemistry¹
- 3 - ENGL 101 Composition I
- 1 - FOR 101 Introduction to Forestry
- 3 - MTHSC 102 Intro. to Mathematical Analysis

15

Second Semester

- 4 - BIOL 104 General Biology II²
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 102 Composition II
- 3 - FOR 221 Wood Properties I
- 3 - Elective

16

Sophomore Year**First Semester**

- 4 - CSENV 202 Skills
- 3 - FOR 205 Dendrology
- 3 - Literature Requirement³
- 3 - Social Science Requirement⁴
- 3 - Elective

16

Second Semester

- 3 - COMM 250 Public Speaking
- 3 - FOR 206 Forestry Ecology
- 4 - PHYS 200 Introductory Physics
- 3 - Economics Requirement⁵
- 3 - Humanities Requirement E.2⁶

16

Forestry Summer Camp

- 2 - FOR 251 Forest Communities
- 4 - FOR 253 Forest Mensuration
- 1 - FOR 254 Forest Products

7

Junior Year**First Semester**

- 3 - EX ST 301 Introductory Statistics⁶
- 3 - FOR 302 Forest Biometrics
- 3 - FOR 304 Forest Resource Economics
- 4 - FOR 413 Integrated Forest Pest Management
- 3 - FOR 460 Silviculture I
- 3 - Minor⁷

19

Second Semester

- 3 - ENGL 314 Technical Writing
- 2 - FOR 308 Remote Sensing and GIS in Forestry
- 3 - FOR 418 Forest Resource Valuation
- 3 - FOR 462 Silviculture II
- 3 - Minor⁷
- 4 - Elective

18

Senior Year**First Semester**

- 4 - FOR 314 Harvesting and Forestry Products
- 2 - FOR (E N R) 416 Forest Policy and Admin.
- 3 - FOR 417 Forest Res. Mgt. and Regulation
- 6 - Minor⁷

15

Second Semester

- 2 - FOR 406 Forest Watershed Management
- 3 - FOR 415 Forest Wildlife Management
- 2 - FOR 423 Current Issues in Natural Resources
- 2 - FOR 425 Forest Resource Management Plans
- 2 - FOR 431 Rec. Resource Plan. in Forest Mgt.
- 3 - Minor⁷

14

136 Total Semester Hours

¹CH 101 may be substituted.²May be satisfied by CH 102 (if CH 101 is taken) or CH 106 (if CH 105 is taken).³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁴See General Education Requirements.⁵Select ECON course from General Education Requirement E.⁶MTHSC 203, 301, or equivalent may be substituted.⁷To be selected by the end of the sophomore year.**GENETICS****Bachelor of Science**

Genetics is the study of heredity. Genetics research takes many forms, from the study of heredity at the level of individual molecules to study at the level of cells and chromosomes, individuals, or populations. To comprehend current genetic information and to make future contributions to our molecular understanding of life processes, students must obtain a broad background in biology and a firm foundation in chemistry and mathematics. This is the basis of the genetics curriculum.

A degree in genetics is a strong preparation for many careers. The degree is an excellent foundational degree for medical, veterinary, or pharmacy school as well as graduate research in any discipline related to biology, including bioinformatics, forensic technology, and genetic counseling. Because of the increasing emphasis on genetics in everyday life, a Bachelor of Science in Genetics can also be a direct path to a career in the emerging biotechnology industries (pharmaceuticals, agricultural technologies, biometric minerals) either in research, sales, or business operations. Combined with a law degree, a genetics bachelor of science is a good background for a career as a patent attorney.

Freshman Year**First Semester**

- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I

16

Second Semester

- 5 - BIOL 111 Principles of Biology II
- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II

16

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 3 - GEN 302 Molecular and General Genetics
- 3 - PHYS 122 Physics with Calculus I¹
- 1 - PHYS 124 Physics Lab. I¹
- 3 - Computer Skills Requirement²

14

Second Semester

- 3 - BIOC 301 Molecular Biochemistry
- 1 - BIOL 302 Molecular Biology
- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - EX ST 301 Introductory Statistics
- 3 - Humanities Requirement E.1²

14

Junior Year**First Semester**

- 3 - BIOSC 461 Cell Biology
- 2 - BIOSC 462 Cell Biology Lab.
- 3 - ENGL 314 Technical Writing
- 3 - GEN 410 Fundamentals of Genetics I
- 1 - GEN 411 Fundamentals of Genetics I Lab.
- 3 - Social Science Requirement²

15

Second Semester

- 3 - GEN 420 Fundamentals of Genetics II
- 1 - GEN 421 Fundamentals of Genetics II Lab.
- 3 - GEN 440 Bioinformatics
- 3 - PHIL 326 Science and Values
- 3 - Social Science Requirement²
- 3 - Elective

16

Senior Year**First Semester**

- 3 - COMM 250 Public Speaking
- 3 - GEN 450 Comparative Genetics
- 2 - GEN 491 Special Problems in Genetics³
- 3 - Science Requirement⁴
- 3 - Elective

14

Second Semester

- 3 - GEN 491 Special Problems in Genetics³
- 2 - GEN (BIOCH) 493 Senior Seminar
- 2-4 Genetics Requirement³
- 6 - Elective

13-15

118-120 hours

¹Medical, veterinary, and graduate school requirements often include two semesters of physics taught with calculus and the physics laboratory. Students are encouraged to check personally requirements for admission to professional post-graduate programs.

²See General Education Requirements.

³To be taken over two semesters, preferably with the same faculty member.

⁴Select from BIOC 423, 431, 432, BIOSC 335, 401, 432, 440, 459, 475, MICRO 416. Other courses must be approved by advisor.

⁵Select from AVS 470, BIOC 436, CSENV 405, GEN (BIOSC) 405, 416, (BIOSC, MICRO) 418, (BIOSC, HORT) 465, (ENT) 495, MICRO 415.

HORTICULTURE**Bachelor of Science**

Horticulture is the art, science, and business of food crops, ornamental plants, and turfgrasses and their production, utilization, and maintenance. A strong foundation in the basic sciences and humanities is built on courses in mathematics, chemistry, botany, physics, computer science, communications, economics, and humanities. Horticulture as a science depends on disciplines such as plant pathology, plant physiology, entomology, forestry, agronomy, soils, agricultural engineering, and agricultural economics. Business courses contribute to a well-rounded curriculum. A growing aspect of horticulture involves the management of enterprises, from production to distribution and marketing. Horticulture as an art involves the arrangement of plants in an aesthetically pleasing fashion.

Students begin professional development as undergraduates. An internship in a horticultural enterprise is required. Students considering graduate school are advised to take optional courses in the basic sciences as well as conduct an undergraduate research project. Those with strong interests in specific disciplines may complete special problems under the supervision of a faculty member.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 3 - ENGL 101 Composition I
- 3 - HORT 101 Horticulture
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 3 - Computer Skills Requirement¹

16

Second Semester

- 3 - BIOSC 205 Plant Form and Function
- 1 - BIOSC 206 Plant Form and Function Lab.
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 101 Introduction to Probability
- 3 - Humanities Requirement E.2¹
- 3 - Social Science Requirement¹

16

Sophomore Year**First Semester**

- 4 - CH 101 General Chemistry
- 3 - HORT 303 Plant Materials
- 3 - Business Requirement²
- 3 - Oral Communication Requirement¹
- 3 - Social Science Requirement¹

16

Second Semester

- 4 - CH 102 General Chemistry
- 3 - HORT 304 Annuals and Perennials
- 3 - HORT 305 Plant Propagation
- 1 - HORT 306 Plant Propagation Techniques Lab.
- 3 - Humanities Requirement E.1¹

14

Summer

- 3 - HORT 271 Internship³ or
- 3 - HORT 471 Advanced Internship¹

Junior Year**First Semester**

- 4 - CSENV 202 Soils
- 3 - Business Requirement¹
- 3 - Life Science Requirement²
- 3 - Physical Science Requirement²
- 3 - Plant Protection Requirement²

16

Second Semester

- 3 - BIOSC 401 Plant Physiology
- 1 - BIOSC 402 Plant Physiology Lab.
- 1 - HORT 409 Seminar
- 3 - Horticulture Specialization Requirement²
- 4 - Physical Science Requirement¹
- 3 - Plant Protection Requirement²

15

Senior Year**First Semester**

- 6 - Horticulture Specialization Requirement²
- 3 - Life Science Requirement¹
- 3 - Writing Intensive Requirement¹
- 4 - Elective

16

Second Semester

- 3 - Departmental Requirement²
- 6 - Horticulture Specialization Requirement²
- 6 - Elective

15

127 Total Semester Hours

¹See General Education Requirements.

²See advisor. Select from approved departmental list.

³Internship must be completed in one or two semesters. Internship may be done fall, spring, or summer after completing HORT 303. Prior approval is required, and a 2.0 grade-point ratio is required for registration.

MICROBIOLOGY**Bachelor of Science**

Microbiology deals with the study of bacteria, viruses, yeasts, filamentous fungi, protozoa, and unicellular algae. Microbiologists seek to describe these organisms in terms of their structures, functions, and processes of reproduction, growth, and death at both the cellular and molecular levels. They are also concerned with their ecology, particularly in regard to their pathological effects on man, and with their economic importance.

The Microbiology major provides a thorough training in the basic microbiological skills. Further, students receive instruction in mathematics, physics, chemistry, and biochemistry, all essential to the training of a modern microbiologist. Students can prepare for a variety of careers through a wide choice of electives. The Microbiology curriculum with Molecular Biology Concentration is recommended for students planning postgraduate programs. Microbiology graduates may enter graduate school in microbiology, biochemistry, bioengineering, or related disciplines; they may enter a medical or dental school or pursue a career in one of the many industries or public service departments dependent upon microbiology. Some of these are the fermentation and drug industries, medical and public health microbiology, various food industries, and agriculture.

Microbiology majors planning to apply for admission to a medical or dental school should inform their advisors immediately upon entering the program.

Freshman Year

First Semester

- 5 - BIOL 110 Principles of Biology I¹
 - 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 4 - MTHSC 106 Calculus of One Variable I
-
- 16

Second Semester

- 5 - BIOL 111 Principles of Biology II¹
 - 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 1 - MICRO 100 Microbes and Human Affairs
 - 3-4 - Mathematical Sciences Requirement²
-
- 16-17

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry
 - 1 - CH 227 Organic Chemistry Lab.
 - 3 - CP SC 120 Intro. to Information Technology
 - 4 - MICRO 305 General Microbiology
 - 3 - Literature Requirement¹
 - 3 - Social Science Requirement¹
-
- 17

Second Semester

- 3 - BIOCH 301 Molecular Biochemistry
 - 3 - CH 224 Organic Chemistry
 - 1 - CH 228 Organic Chemistry Lab.
 - 3 - Approved Requirement⁵
 - 3 - Literature Requirement¹
 - 4-3 - Mathematical Sciences or Science Requirement⁶
-
- 17-16

Junior Year

First Semester

- 3 - COMM 250 Public Speaking
 - 4 - MICRO 401 Advanced Bacteriology
 - 4-3 - Physics Requirement⁷
 - 6-7 - Elective
-
- 17

Second Semester

- 4 - MICRO 412 Bacterial Physiology
 - 4 - MICRO 415 Microbial Genetics
 - 4 - Physics Requirement⁷
 - 3 - Social Science Requirement¹
 - 3-4 - Elective
-
- 18-19

Senior Year

First Semester

- 3 - ENGL 314 Technical Writing
 - 14-13 - Approved Requirement³
-
- 17-16

Second Semester

- 4 - MICRO 411 Pathogenic Bacteriology
 - 12 - Approved Requirement⁵
-
- 16

134 Total Semester Hours

¹BIOL 103 may substitute for BIOL 110, and BIOL 104 may substitute for BIOL 111; the remaining 1-2 hours required must be satisfied by completing 1-2 extra hours in either biological sciences or microbiology.

²Select from MTHSC 108, 301, or EX ST 301. MTHSC 108 is required for Microbiology—Molecular Biology majors.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴See General Education Requirements.

⁵A minimum of 15 credits must be selected from AVS 458, BIOSC 403, 404, 425, 426, 456/457, MICRO 400, 403, 407, 410, 413, (AVS, BIOSC) 414, 416, 417, 491 (six credits maximum with advisor's approval).

⁶GEOL 101 or any science course at the sophomore level or above, excluding microbiology, with advisor's approval.

⁷Select from PHYS 207/208 or 122/221/223.

MOLECULAR BIOLOGY CONCENTRATION

See Microbiology curriculum for Freshman year.

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry
 - 1 - CH 227 Organic Chemistry Lab.
 - 3 - CP SC 120 Intro. to Information Technology
 - 4 - MICRO 305 General Microbiology
 - 3 - Literature Requirement¹
 - 3 - Social Science Requirement¹
-
- 17

Second Semester

- 3 - BIOCH 301 Molecular Biochemistry
 - 3 - CH 224 Organic Chemistry
 - 1 - CH 228 Organic Chemistry Lab.
 - 3 - Literature Requirement¹
 - 3 - Microbiology Requirement¹
 - 3 - Social Science Requirement²
-
- 16

Junior Year

First Semester

- 3 - CH 313 Quantitative Analysis
 - 1 - CH 317 Quantitative Analysis Lab.
 - 4 - MICRO 401 Advanced Bacteriology
 - 4 - MICRO (AVS, BIOSC) 414 Basic Immunology
 - 4-3 - Physics Requirement⁴
 - 2-3 - Elective
-
- 18

Second Semester

- 3 - COMM 250 Public Speaking
 - 4 - MICRO 412 Bacterial Physiology
 - 3 - MICRO 417 Molecular Mechanisms of Carcinogenesis and Aging
 - 4 - Physics Requirement⁴
 - 3 - Elective
-
- 17

Senior Year

First Semester

- 3 - BIOCH 423 Principles of Biochemistry
 - 3 - ENGL 314 Technical Writing
 - 4 - MICRO 415 Microbial Genetics
 - 3 - MICRO 416 Introductory Virology
 - 3 - Elective
-
- 16

Second Semester

- 3 - BIOCH 432 Biochemistry of Metabolism
 - 4 - MICRO 411 Pathogenic Bacteriology
 - 3 - MICRO 491 Special Problems in Microbiology
 - 8 - Elective
-
- 18

135 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

²See General Education Requirements.

³AVS 458, BIOSC 403, 404, 425, 426, 456/457, MICRO 400, 403, 407, 410, or 413.

⁴Select from PHYS 207/208 or 122/221/223.

PACKAGING SCIENCE Bachelor of Science

The Bachelor of Science degree in Packaging Science prepares students for careers in industries producing and utilizing packages for all types of products. Packaging is an essential part of industrialized economies, protecting, preserving, and helping to market products. The field of packaging is highly competitive and highly innovative, requiring an ever-increasing number of professional positions.

Opportunities for employment include a wide variety of career paths such as manufacturing, marketing, sales, design, purchasing, quality assurance, and customer services. Most career opportunities are in positions requiring technical knowledge combined with marketing and management skills.

The core curriculum assures graduates of having the skills and knowledge required by most entry-level packaging positions. Emphasis area choices allow students to select courses to improve career preparation for specific industry segments. The food packaging emphasis area prepares students for this technically challenging field; the general packaging emphasis area allows students to concentrate in other speciality areas, such as environmental science or graphic communications.

Students changing majors to Packaging Science must have at least a 2.0 cumulative grade-point ratio.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I
 - 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 1 - PKGSC 101 Packaging Orientation¹
 - 3 - Mathematical Sciences Requirement²
-
- 15

Second Semester

- 4 - BIOL 104 General Biology II
 - 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 4 - MTHSC 106 Calculus of One Variable I
 - 2 - PKGSC 102 Intro. to Packaging Science¹
 - 1 - Elective
-
- 18

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 104 Organic Chemistry Lab.
- 3 - CP SC 120 Intro. to Information Technology
- 4 - PHYS 207 General Physics I¹
- 4 - PKGSC 202 Packaging Materials and Manuf.¹
- 3 - THRD 180 Introduction to Technical Drawing and Computer-Aided Drafting

18

Second Semester

- 3 - FD SC 214 Food Resources and Preservation
- 4 - GC 104 Graphic Communications I
- 3 - PKGSC 204 Container Systems¹
- 1 - PKGSC 206 Container Systems Lab.
- 3 - Emphasis Area²
- 3 - Humanities Requirement E.1⁴

17

Summer

- 0 - CO-OP 101 Cooperative Education³

Junior Year**First Semester**

- 3 - COMM 250 Public Speaking
- 3 - PKGSC 368 Packaging and Society
- 3 - PKGSC 404 Mechanical Properties of Packages and Principles of Package Evaluation
- 2 - PKGSC 454 Package Evaluation Lab.
- 3 - Emphasis Area²
- 3 - Social Science Requirement⁴

17

Second Semester

- 3 - ENGL 314 Technical Writing
- 4 - MICRO 305 General Microbiology
- 3 - PKGSC 401 Packaging Machinery
- 3 - PKGSC 440 Packaging for Distribution
- 3 - Emphasis Area²

16

Senior Year**First Semester**

- 3 - EX ST 301 Introductory Statistics
- 3 - PKGSC 464 Food Packaging Systems
- 1 - PKGSC 466 Food Packaging Systems Lab.
- 3 - Emphasis Area²
- 3 - Humanities Requirement E.2⁴
- 3 - Social Science Requirement⁴

16

Second Semester

- 3 - PKGSC 416 Appl. of Polymers in Packaging
- 3 - PKGSC 420 Package Design and Development
- 3 - Emphasis Area²
- 9 - Elective

18

135 Total Semester Hours

¹A C or better is required in this course for graduation.²See advisor.³PHYS 122 and 124 may be substituted.⁴See General Education Requirements.⁵Students are required to complete at least one 15-week period (six months preferred) of Cooperative Education.⁶AP EC 202 or ECON 211, and three credits selected from HIST 101, 102, 172, 173, PO SC 101, PSYCH 201, R S (SOC) 401; SOC 201, GEOG 101, 103.**PREPROFESSIONAL HEALTH STUDIES****Non-degree**

The health professions need individuals with a diversity of educational backgrounds and a wide variety of talents and interests. The philosophies of education, the specific preprofessional course requirements, the noncognitive qualifications for enrollment, and the systems of training vary among the professional health schools; but all recognize the desirability of a broad education—a good foundation in the natural sciences, highly developed communication skills, and a solid background in the humanities and social sciences. The absolute requirements for admission to professional health schools are limited to allow latitude for developing individualized undergraduate programs of study; however, most schools of medicine and dentistry require 16 semester hours of chemistry, including organic chemistry, eight hours of biological sciences, eight hours of physics, and at least one course in calculus. These requirements should be balanced with courses in vocabulary building, the humanities, and social sciences. The basic requirements in the natural sciences and as many of the courses in the humanities and social sciences as possible should be completed by the third year so that students will be prepared to take the Dental Admission Test or the Medical College Admission Test prior to applying to a professional school.

Undergraduates may also prepare to study optometry, podiatry, and other health professions. While the basic requirements for these professional schools are essentially the same as those for schools of medicine and dentistry, specific requirements for individual schools in these professions vary somewhat; consequently, interested students are advised to consult with the chief health professionals advisor.

At Clemson, rather than having a separate, organized preprofessional health study program, students are allowed to major in any curriculum, as long as the basic entrance requirements of the professional health school are fulfilled. These schools are not as concerned about a student's major as they are about academic performance whichever curriculum the student chooses. Professional health schools have neither preferences nor prejudices concerning any curriculum, which is evidenced by the fact that their entering students represent a broad spectrum of curricula. The emphasis is placed on the student's doing well in the curriculum chosen, and this becomes critical as competition increases for the limited number of places available in professional health schools.

PREPHARMACY

Prepharmacy is a two-year program requiring a minimum of 68 semester hours. Upon completion of the curriculum, students will be eligible to apply to a college of pharmacy, usually the Medical University of South Carolina or the University of South Carolina. The degree in Pharmacy is awarded by the institution attended. It is important for students to work closely with their advisor as there are variations in courses required by the pharmacy schools.

For financial aid purposes, students in the Prepharmacy program are considered to be enrolled in a degree-seeking program.

First Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability¹ or 3 - HIST 365 English Cultural History²
- 3 - PSYCH 201 Introduction to Psychology

17

Second Semester

- 4 - BIOL 104 General Biology II
- 4 - CH 102 General Chemistry
- 3 - ECON 200 Economic Concepts
- 3 - ENGL 102 Composition II
- 4 - MTHSC 106 Calculus of One Variable I or 3 - MTHSC 102 Intro. to Math. Analysis

17-18

Second Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - MICRO 305 General Microbiology or 3-4 - Physiology Requirement¹
- 4 - PHYS 207 General Physics I
- 3 - Fine Arts Requirement⁴
- 4 - Foreign Language Requirement or 3 - Liberal Arts Requirement⁵

17-19

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 3 - COMM 150 Intro. to Speech Communication
- 3 - MTHSC 301 Stat. Theory and Methods I or 3 - EX ST 301 Introductory Statistics
- 4 - PHYS 208 General Physics II
- 4 - Foreign Language Requirement or 3 - Liberal Arts Requirement⁵

17-18

68-72 Total Semester Hours

¹Chemistry requires proficiency in algebra; physics requires proficiency in trigonometry. Entering freshmen must present a satisfactory score on the Clemson Mathematics Placement Test or register in the first semester in MTHSC 103.

²The Medical University of South Carolina requires a math course. The University of South Carolina requires a history course. To be eligible for both professional schools, the course not taken this semester must be taken during a summer term.

³The Medical University of South Carolina requires MICRO 305. The University of South Carolina requires a physiology course. To be eligible for both professional schools, the course not taken this semester must be taken during a summer term.

¹See advisor.

²The University of South Carolina requires credit for two semesters of a foreign language or exemption by examination. Students exempting the foreign language must take a liberal arts requirement. Either the foreign language or the liberal arts requirement meets the Medical University of South Carolina requirement.

PREREHABILITATION SCIENCES

Prerehabilitation Sciences includes concentrations in physical therapy, occupational therapy, physician assistant, and allied health areas. This curriculum is designed to meet the requirements of the rehabilitation medicine programs at the Medical University of South Carolina and other professional schools. This program requires a minimum of 68–90 semester hours of undergraduate coursework depending on the concentration. In addition, students must apply to a professional school for acceptance into its program.

Because preparation of some of the concentrations requires three years, students are advised to select a major with similar requirements after consultation with the Prerehabilitation Sciences advisor. The following curriculum fulfills the general requirements for those fields, requiring only two years of prerequisites. The Prephysical Therapy and Preoccupational Therapy concentrations require an additional year of electives. These electives should be chosen after consultation with the advisor. Professional schools may change their requirements at any time, so it is imperative that students in this major stay in close contact with their advisor.

For financial aid purposes, students in the Prerehabilitation Sciences program are considered to be enrolled in a degree-seeking program.

First Year

First Semester

- 4 - BIOL 103 General Biology I
 - 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 3 - PSYCH 201 Introduction to Psychology
 - 3-4 - Mathematical Sciences Requirement¹
- 17-18

Second Semester

- 4 - BIOL 104 General Biology II
 - 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 3 - Humanities Requirement²
 - 3 - Mathematical Sciences Requirement¹
- 17

Second Year

First Semester

- 4 - BIOSC 222 Human Anatomy and Phys. I
 - 4 - PHYS 207 General Physics I
 - 3 - PSYCH 340 Lifespan Developmental Psych.
 - 3 - Humanities Requirement²
 - 3 - Literature Requirement¹
- 17

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
 - 3 - COMM 150 Intro. to Speech Communication
 - 3 - CP SC 120 Intro. to Information Technology
 - 3 - HIST 365 English Cultural History
 - 4 - PHYS 208 General Physics II
- 17

Third Year¹

68-90 Total Semester Hours

¹See advisor. Two courses selected from MTHSC 102 or 106 and EXST 301 or MTHSC 301. To register for MTHSC 102 or 106, entering students must present a satisfactory score on the Clemson Mathematics Placement Test or register in the first semester for MTHSC 103.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴Currently only the Prephysical Therapy and Preoccupational Therapy concentrations require a third year. Although any credit course may satisfy the requirements for the third year, students are advised to select courses in consultation with the advisor to satisfy General Education Requirements.

PREVETERINARY MEDICINE

Under a regional plan, the South Carolina Preveterinary Advisory Committee coordinates a program for South Carolina residents who are interested in pursuing careers in veterinary medicine. South Carolina residents attending any college or university may apply through the Veterinary Medical College Application Service (VMCAS) to the University of Georgia College of Veterinary Medicine. Currently the University of Georgia admits up to 17 students each year through arrangements with the Southern Regional Education Board. The State of South Carolina also has a contract with Tuskegee University to admit up to four South Carolina residents. Application must be made directly to Tuskegee University.

Minimum requirements for admission to a college of veterinary medicine generally include the satisfactory completion of prescribed courses in a well-rounded undergraduate degree program. Specific requirements for admission to the University of Georgia College of Veterinary Medicine include the following undergraduate courses: six credits of English, 14 credits of humanities and social studies, eight of physics, eight of general biology, eight credits of advanced biology, three credits of biochemistry, and 16 credits of organic and inorganic chemistry. (Chemistry and physics courses must be at the pre-medical level; they may not be survey courses.)

To be in the best competitive position, applicants should complete courses in animal agriculture, genetics, nutrition, biochemistry, and advanced biology. Considerations for selection are character, scholastic achievement, personality, experience with large and small animals, general knowledge, and motivation. In the past, competition has been keen, and only those applicants who have shown exceptional ability have been admitted. Specific considerations may include a minimal grade-point average and completion of standardized tests such as the Graduate Record Examination and the Veterinary College Admission Test.

Since out-of-state students attending Clemson are ineligible to apply to the University of Georgia or Tuskegee University under the South Carolina quota, they should contact the college(s) of veterinary medicine to which they plan to apply. They may apply at the University of Georgia for at-large admission.

Veterinary schools accept students with a broad range of academic backgrounds; therefore, it is recommended that the beginning university student select any undergraduate major and simultaneously complete the courses required for veterinary school entrance and those required for completion of a BS or BA degree. For students selecting Animal and Veterinary Sciences or Biological Sciences at Clemson University, the basic curricula have been designed to accommodate Georgia's entrance requirements. Further information is available from the Department of Animal and Veterinary Sciences at 864-656-3427.

TURFGRASS

Bachelor of Science

The Turfgrass program is designed for students interested in careers in the rapidly growing turfgrass industry, with courses in turfgrass management, pathology, agricultural mechanization, personnel management, soil fertility, soil microbiology, weed control, and park and recreation management. Graduates pursue careers in professional lawn care; maintenance of parks, athletic fields, and golf courses; production and sale of seed, sod, supplies, and equipment; or as technicians for businesses or government agencies.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I
 - 3 - ENGL 101 Composition I
 - 3 - HORT 101 Horticulture
 - 3 - MTHSC 102 Intro. to Mathematical Analysis
 - 3 - Computer Skills Requirement¹
- 16

Second Semester

- 3 - BIOSC 205 Plant Form and Function
 - 1 - BIOSC 206 Plant Form and Function Lab.
 - 3 - ENGL 102 Composition II
 - 3 - EXST 301 Introductory Statistics or
 - 3 - MTHSC 101 Introduction to Probability
 - 3 - Humanities Requirement E.2¹
 - 3 - Social Science Requirement¹
- 16

Sophomore Year

First Semester

- 4 - CH 101 General Chemistry
 - 3 - HORT 212 Introduction to Turfgrass Culture
 - 1 - HORT 213 Turfgrass Culture Lab.
 - 3 - HORT 303 Plant Materials
 - 3 - Oral Communication Requirement¹
- 14

Second Semester

- 4 - CH 102 General Chemistry
 - 3 - Business Requirement²
 - 3 - Humanities Requirement E.1¹
 - 3 - Social Science Requirement¹
 - 3 - Writing Intensive Requirement¹
- 16

Summer

- 3 - HORT 271 Internship¹ or
3 - HORT 471 Advanced Internship¹

Junior Year**First Semester**

- 4 - CSENV 202 Soils
3 - Physical Science Requirement²
3 - Plant Protection Requirement²
4 - Elective

14

Second Semester

- 3 - BIOSC 401 Plant Physiology
1 - BIOSC 402 Plant Physiology Lab.
3 - Business Requirement³
3 - Life Science Requirement²
4 - Physical Science Requirement²
3 - Plant Protection Requirement²

17

Senior Year**First Semester**

- 3 - HORT 412 Turfgrass Management
6 - Horticulture Specialization Requirement²
4 - Life Science Requirement²
3 - Life Science Requirement²

16

Second Semester

- 3 - HORT 420 Contemporary Issues in Turfgrass
Science and Management
3 - Horticulture Specialization Requirement²
3 - Soils Requirement²
6 - Elective

15

127 Total Semester Hours

¹See General Education Requirements.²See advisor.

³Internship must be completed in one or two semesters. Internship may be done fall, spring, or summer after completing HORT 212/213. Prior approval is required, and a 2.0 grade-point ratio is required for registration.

WILDLIFE AND FISHERIES BIOLOGY**Bachelor of Science**

Increased interest in conservation of natural resources and the environment and demand for seafood products have resulted in these areas becoming increasingly technical and requiring highly qualified wildlife and fisheries biologists. Greatest demands for graduates are in the areas of management, research, survey, and regulatory positions with state and federal agencies; industrial research and quality control laboratories; conservation, recreational, and other public service agencies; and private enterprises.

The undergraduate curriculum provides a solid foundation for many careers in the sciences. The curriculum is strong in basic and applied sciences, communication skills, and the social sciences. In addition, six credit hours are available for field training with appropriate natural resource agencies. Students can satisfy coursework requirements for professional certification by the Wildlife Society and/or the American Fisheries Society.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
4 - CH 101 General Chemistry
3 - ENGL 101 Composition I
1 - W F B 101 Introduction to Wildlife and Fisheries Biology
3 - Mathematical Sciences Requirement¹

15

Second Semester

- 4 - BIOL 104 General Biology II
4 - CH 102 General Chemistry
3 - ENGL 102 Composition II
3 - Mathematical Sciences Requirement¹
1 - Elective

15

Sophomore Year**First Semester**

- 3 - AP EC 257 Natural Resources, Environment, and Economics *or*
3 - C R D 357 Natural Resources Economics
4 - CSENV 202 Soils
3 - W F B 300 Wildlife Biology
1 - W F B 301 Wildlife Biology Lab.
3 - Bioscience Requirement²
3 - Elective

17

Second Semester

- 3 - W F B 350 Prin. of Fish and Wildlife Biology
3 - Bioscience Requirement²
3 - Computer Skills Requirement²
3 - Humanities Requirement E.1¹
3 - Social Science Requirement¹

15

Junior Year**First Semester**

- 4 - AN PH 301 Physiology and Anatomy of Domestic Animals
3 - ENGL 314 Technical Writing
3 - W F B 462 Wetland/Wildlife Biology
3 - Approved Requirement¹
3 - Humanities Requirement E.2¹

16

Second Semester

- 3 - E N R 302 Natural Resources Measurements
3 - EX ST 301 Introductory Statistics
3 - GEN 302 Molecular and General Genetics *or*
3 - BIOSC 335 Evolutionary Biology
3 - W F B (BIOSC) 313 Conservation Biology
3 - Approved Requirement¹

15

Senior Year**First Semester**

- 3 - W F B 416 Fishery Biology
3 - W F B 430 Wildlife Conservation Policy
3 - Approved Requirement¹
3 - Botany Requirement⁴
3 - Ecology Requirement¹

15

Second Semester

- 3 - COMM 250 Public Speaking
3 - W F B 412 Wildlife Management
3 - W F B 440 Non-game Wildlife Management
1 - W F B 499 Wildlife Biology and Fisheries Sem.
6 - Elective

16

124 Total Semester Hours

¹See General Education Requirements. (EX ST 301 may not be used to satisfy the Mathematical Sciences Requirement.)

²Three credits from BIOSC 302 or 303, and three credits from 304 or 305.

³Nine credits selected from departmental list.

⁴At least three credits from BIOSC 320, 406/407, FOR 205.

⁵Select from BIOSC: 441, 443, 446, FOR 315.

MINORS

Following are minors acceptable for students in the College of Agriculture, Forestry, and Life Sciences. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting	History
Adult/Extension Education	Horse Production— <i>not open to Animal and Veterinary Sciences majors</i>
Aerospace Studies	Horticulture— <i>not open to Turfgrass majors</i>
African American Studies	Human Resource Management
Agricultural Business Management	International Politics
Agricultural Mechanization and Business	Legal Studies
Anthropology	Management
Athletic Leadership	Mathematical Sciences
Beef Cattle Production— <i>not open to Animal and Veterinary Sciences majors</i>	Microbiology
Biochemistry	Military Leadership
Bioengineering	Modern Languages
Biological Sciences	Music
Business Administration	Natural Resource Economics
Chemistry	Operations Management
Cluster	Packaging Science
Communication Studies	Parks, Recreation, and Tourism Management
Communications	Philosophy
Computer Science	Physics
Crop and Soil Environmental Science	Political Science
Early Intervention	Poultry Science— <i>not open to Animal and Veterinary Sciences majors</i>
East Asian Studies	Psychology
Economics	Public Policy
Education	Religion
English	Science and Technology in Society
Entomology	Screenwriting
Entrepreneurship	Sociology
Environmental Engineering	Spanish-American Area Studies
Environmental Science and Policy	Textiles
Film Studies	Theatre
Financial Management	Turfgrass— <i>not open to Horticulture majors</i>
Fine Arts	Urban Forestry
Food Science	Wildlife and Fisheries Biology
Forest Products	Women's Studies
Forest Resource Management	Writing
Geography	
Geology	
Great Works	
Health Science	

See pages 35–38 for details.

COLLEGE OF ARCHITECTURE, ARTS, AND HUMANITIES

The collaboration of Architecture (Landscape Architecture, Construction Science and Management, City and Regional Planning, and Architecture) with Arts (Visual Arts and Performing Arts) and the Humanities (Communication Studies, English, History, Languages, Philosophy, and Religion) produces a remarkably rich environment for study. The mixture of core disciplines with applied professions/disciplines in the College provides both depth and breadth in learning. This structure affords students and faculty with skills that address the complex and interconnected challenges of the future, where it is no longer possible for these problems to be solved in a single discipline or profession. It is through the connections and communication between specialized knowledge areas that significant cultural progress will be made. These kinds of thoughts and actions form a fundamental part of the College of Architecture, Arts, and Humanities.

To illustrate these ideas, consider the diversity of communication skills practiced and taught in the College. Students learn graphic and artistic communication, technical communication with computers, spoken communication, and communication through the written word. Each skill is vital to a successful student, and it is the collaboration between these forms of communication that prepares students for the complex challenges of the future.

SCHOOL OF DESIGN AND BUILDING AND SCHOOL OF THE ARTS

The Bachelor of Arts in Architecture degree is the preprofessional preparation for two years of graduate study leading to the Master of Architecture degree, which is the fully accredited professional degree in the field. The accredited Bachelor of Science in Construction Science and Management program prepares students for careers as professional managers in the construction industry. A graduate program is also offered leading to the Master of Construction Science and Management. The Visual Arts program offers professional study in the studio visual arts leading to the Bachelor of Fine Arts degree. A graduate program leading to the Master of Fine Arts is also offered. The accredited five-year Bachelor of Landscape Architecture degree program prepares students for careers as professional landscape architects. The Bachelor of Arts in Production Studies in Performing Arts is a distinctive degree program that combines practical hands-on experiences in performing arts production technologies with classes in music and theatre performance, history, and theory. A graduate program in City and Regional Planning is housed within the school and accepts graduates from a variety of baccalaureate programs and prepares them for careers in both public and private sector planning through its Master of City and Regional Planning degree.

In addition to the facilities housed on the Clemson campus, the College offers students the opportunity to study at two off-campus sites. The center at the College of Charleston is available to third- and fourth-year architecture and fourth-year landscape architecture students for a semester's study while earning credit from both Clemson University and the College of Charleston. The Charles E. Daniel Center for Building Research and Urban Studies in Genoa, Italy, provides graduate students and upper division undergraduates in the above mentioned programs a semester's residence in an intensive program of study and travel while earning full credit toward their degrees.

Architecture Charleston Program

Located in Charleston, South Carolina, this program is available to qualified undergraduates in Architecture, Art, Construction Science and Management, and Landscape Architecture. Studio work is oriented toward design within the historic seaport setting. Students also enroll in classes at the University of Charleston campus. The program is enriched by visiting scholars and professionals from the area.

Architecture Overseas Program

The Daniel Center for Urban Studies in Genoa, Italy, is available to qualified Master of Architecture, Construction Science and Management, Fine Arts, City and Regional Planning, and professional year Landscape Architecture students. Studio and classroom work is enriched by visiting scholars and complemented by scheduled field trips, both in Italy and continental Europe. Undergraduate Architecture students in their third or fourth year may also participate in the Italian program.

Entrance Requirements

Admission to degree programs in the School of Design and Building and the School of the Arts is based on academic performance and is limited based on space availability in the various programs. Students seeking admission are advised to apply to the Admissions Office early in the fall of their senior year in high school. They are also encouraged to visit the school during their senior year. Faculty are available to meet with them and their parents informally and answer questions and discuss individual programs in more detail. Prospective students may schedule appointments by calling the individual department.

Change of Major

When space is available, a student may change majors to one of the degree programs in the School of Design and Building with a 2.5 cumulative grade-point ratio, at least 30 credit hours earned, and design aptitude evidenced by a portfolio review (in the case of the Architecture discipline) or by approval of the department chair.

Advancement in Architecture

Students enrolled in second-, third-, or fourth-year design studios and theory courses must attain at least a 2.0 grade-point ratio in each year level (by repeating one or both semesters, if necessary) to qualify for advancement to the next year level or, in the case of fourth-year Architecture studios, to qualify for the Architecture degree, or in Landscape Architecture at the fifth year, to qualify for the Bachelor of Landscape Architecture degree.

SCHOOL OF HUMANITIES

The Bachelor of Arts degree is offered in Communication Studies, English, History, Language and International Trade, Modern Languages, and Philosophy. The Bachelor of Science degree is offered in Language and International Health.

To achieve depth as well as breadth in their educational experiences, students majoring in Communication Studies, English, History, Modern Languages, or Philosophy complete at least 24 semester hours from courses above the sophomore level. As soon as feasible and not later than the end of the sophomore year, students in these fields also select a minor, consisting of at least 15 additional semester hours. Courses satisfying the major may not also be included in the minor. A second major (a double major) may substitute for the minor, provided all requirements are fulfilled for each major.

The Bachelor of Arts in Communication Studies, English, History, Modern Languages, and Philosophy requires 130 total semester credits; Language and International Trade requires 129–137, depending on the concentration. Of these, at least 12 credits must be earned in humanities courses numbered 300 or higher (A H 210, MUSIC 210, and THEA 210 excepted). All majors in the School of Humanities (with the exception of English majors) must earn 12 credits in social science courses numbered 300 or higher. English majors must earn at least six credits in this category. The humanities for this purpose are considered to include art and architectural history, communication studies (except 362 and 364), English (except 304, 312, 314, 316, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, theatre (except 377, 487, and 497), and women's studies, as well as courses entitled Humanities. The social sciences for this purpose are considered to include agricultural and applied economics, anthropology, economics, geography, history, political science, psychology, and sociology. The foreign language requirement in humanities is a proficiency requirement. Students must complete through 202 in Chinese, French, German, Italian, Japanese, Latin, Portuguese, Russian, or Spanish.

Students enrolled in degree programs offered in the humanities who expect to teach in the public schools may elect education courses required for teaching certificates by the South Carolina State Department of Education. Such courses are to be approved by their own department advisors.

Students may transfer into the Undeclared category in the Humanities only if they have completed 45 or fewer credit hours.

ARCHITECTURE

Bachelor of Arts

Architects have a creative responsibility of designing the buildings which shape our physical environment. To understand the humanistic, economic, and technological nature of environmental problems, students must have a sound general education. Subsequent professional education must be preparation for a life of continuing change in which the problems to be solved will be large and small, for every sort of function, in every type of climate, and for every condition of budget.

Architectural Registration/Licensure

Most states require that an individual intending to become an architect hold an accredited degree. There are two types of degrees that are accredited by the National Architectural Accrediting Board: (1) the Bachelor of Architecture, which requires a minimum of five years of study, and (2) the Master of Architecture, which requires a minimum of three years of study following an unrelated bachelor's degree or two years following a related preprofessional bachelor's degree. The professional degrees are structured to educate those who aspire to registration/licensure as architects.

The four-year preprofessional degree, where offered, is not accredited by NAAB; it is useful for those wishing a foundation in the field of architecture, as preparation for either continued education in a professional degree program, or for employment options in architecturally related areas.

Freshman Year

First Semester

- 4 - ARCH 151 Collaborative Studio I
- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Foreign Language Requirement¹

18

Second Semester

- 3 - ARCH 152 Collaborative Studio II
- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 301 Stat. Theory and Methods I
- 4 - Foreign Language Requirement
- 1 - Elective

17

Sophomore Year

First Semester

- 3 - A H 101 Survey of Art and Arch. History I
- 4 - ARCH 251 Collaborative Studio III
- 3 - ENGL 207 Survey of World Literature I
- 4 - PHYS 207 General Physics I
- 3 - Foreign Language Requirement¹

17

Second Semester

- 3 - A H 102 Survey of Art and Arch. History II
- 4 - ARCH 252 Collaborative Studio IV
- 3 - ENGL 208 Survey of World Literature II
- 4 - PHYS 208 General Physics II
- 3 - Foreign Language Requirement¹

17

Junior Year

First Semester

- 6 - ARCH 351 Architecture Studio I
- 3 - C S M 201 Structures I
- 3 - History and Theory Requirement¹
- 3 - Technology Requirement¹
- 3 - Minor

18

Second Semester

- 6 - ARCH 352 Architecture Studio II
- 3 - C S M 202 Structures II
- 3 - History and Theory Requirement¹
- 3 - Technology Requirement¹
- 3 - Minor

18

Senior Year

First Semester

- 6 - ARCH 451 Architecture Studio III
- 3 - C S M 304 Environmental Systems I
- 3 - Humanities Seminar¹
- 3 - Minor
- 3 - Elective

18

Second Semester

- 6 - ARCH 452 Architecture Studio IV
- 6 - Minor
- 6 - Elective

18

141 Total Semester Hours

¹See advisor.

COMMUNICATION STUDIES

Bachelor of Arts

The Bachelor of Arts in Communication Studies is designed to provide a thoroughly integrated yet individual degree program that will prepare students for careers in business, government, and public sectors. In addition, the program provides a foundation for graduates who wish to pursue advanced degrees in the humanities, social sciences, business, and law. Communication Studies examines communication in a variety of contexts. Students will select an emphasis area that is germane to individual career interests: Organizational Studies, Media Studies, or Relational/Cultural Studies.

Students may change majors into the Communication Studies program based on approval of a committee of faculty from the Department of Communication Studies. The deadline for applying for a change of major during the fall semester is September 15, with decisions made by October 1. For spring semester changes of major, the deadline is February 15, with decisions made by March 1. The Department of Communication Studies accepts a maximum of 30 changes of major per year. To qualify for acceptance, applicants should have completed the following courses prior to the semester of application: ENGL 101 and 102, HIST 172 or 173, one of the mathematical sciences requirements¹, the computer skills requirement¹, and COMM 201 (with a C or better). Students requesting a transfer into the Communication Studies program with

fewer than 50 hours must have a grade-point ratio of 2.3 or higher; students with 50 hours or more must have a grade-point ratio of 2.5 or higher. An application form and a 3–5-page writing sample are also required. Detailed information is available from the Communication Studies Department, 408 Strode Tower.

¹See General Education Requirements.

COMM 250 or 251 is required of all Communication Studies majors.

I. Core Courses (15 hours)

COMM 201, 301, 310, 360 or 361, 495

II. Emphasis Areas (12 hours)

Organizational Studies—COMM 364, 464, and two courses from COMM 367, 368, 460.

Media Studies—COMM 302, 402, and two courses from COMM 300, 320, ENGL 357.

Relational/Cultural Studies—COMM 348, 480, and two courses from COMM 330, 350, 455.

III. General Requirements (9 hours)

Any 300- or 400-level communication studies course. Additional courses taken under an emphasis area may also be used to fulfill this requirement.

36 total hours

Advanced Social Science Requirement (12 hours)

Electives as needed to complete 130 hours

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 4 - Foreign Language Requirement
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement¹

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 4 - Foreign Language Requirement
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement¹

17

Sophomore Year

First Semester

- 3 - COMM 250 Public Speaking or
- 3 - COMM 251 Business and Prof. Speaking
- 3 - Computer Skills Requirement¹
- 3 - Foreign Language Requirement
- 3 - Literature Requirement²
- 6 - Elective

18

Second Semester

- 3 - Advanced Social Science Requirement¹
- 3 - Foreign Language Requirement
- 3 - Literature Requirement²
- 6 - Major and Minor Areas
- 1 - Elective

16

Junior Year**First Semester**

- 3 - Advanced Social Science Requirement¹
 - 9 - Major and Minor Areas
 - 3 - Writing Intensive Requirement¹
- 15

Second Semester

- 15 - Major and Minor Areas
- 15

Senior Year**First Semester**

- 3 - Advanced Social Science Requirement¹
 - 12 - Major and Minor Areas
 - 2 - Elective
- 17

Second Semester

- 3 - Advanced Social Science Requirement¹
 - 9 - Major and Minor Areas
 - 3 - Elective
- 15

130 Total Semester Hours

¹See General Education Requirements.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

³See advisor.

CONSTRUCTION SCIENCE AND MANAGEMENT

Bachelor of Science

As the largest single industry in the United States and one of the most important, construction offers unlimited opportunities to highly motivated and professionally educated men and women. Future professionals must be skilled in managing people, equipment, and capital, coupled with a grasp of construction materials and methods and the complex technologies of modern construction. The Bachelor of Science in Construction Science and Management curriculum is the basis for a career in construction or as a developer or building management specialist.

Freshman Year**First Semester**

- 3 - A A H 210 Intro. to Art and Architecture
 - 3 - ARCH 201 Introduction to Architecture
 - 3 - ENGL 101 Composition I
 - 4 - MTHSC 106 Calculus of One Variable I¹
 - 4 - PHYS 207 General Physics I
- 17

Second Semester

- 3 - C S M 100 Introduction to Construction Science and Management
 - 3 - CP SC 120 Intro. to Information Technology
 - 3 - ENGL 102 Composition II
 - 3 - MTHSC 301 Stat. Theory and Methods I¹
 - 4 - PHYS 208 General Physics II
- 16

Sophomore Year**First Semester**

- 2 - B E 221 Surveying for Soil and Water Res.
 - 3 - C S M 201 Structures I
 - 3 - C S M 203 Materials and Methods of Const. I
 - 3 - ECON 211 Principles of Microeconomics
 - 3 - Literature Requirement²
 - 3 - Elective
- 17

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 3 - C S M 202 Structures II
 - 3 - C S M 204 Contract Documents
 - 3 - C S M 205 Materials and Methods of Const. II
 - 3 - COMM 150 Intro. to Speech Communication *or*
 - 3 - COMM 250 Public Speaking
 - 3 - ECON 212 Principles of Macroeconomics
- 18

Junior Year**First Semester**

- 3 - C S M 301 Structures III
 - 3 - C S M 303 Soils and Foundations
 - 3 - C S M 304 Environmental Systems I
 - 3 - C S M 351 Construction Estimating
 - 3 - ENGL 304 Business Writing *or*
 - 3 - ENGL 314 Technical Writing
 - 3 - Elective
- 18

Second Semester

- 3 - C S M 305 Environmental Systems II
 - 3 - C S M 352 Construction Scheduling
 - 3 - C S M 353 Construction Estimating II
 - 3 - LAW 322 Legal Environment of Business
 - 3 - MGT 307 Personnel Management
 - 3 - Elective
- 18

Senior Year**First Semester**

- 3 - C S M 411 Safety in Building Construction
 - 3 - C S M 453 Construction Project Management
 - 3 - C S M 461 Construction Economics Seminar
 - 6 - Major Requirement³
- 15

Second Semester

- 6 - C S M 454 Construction Capstone
 - 0 - C S M 491 CSM Internship and Examination
 - 6 - Major Requirement³
 - 3 - Elective
- 15

134 Total Semester Hours

¹The sequence MTHSC 101, 102, and 203 may be substituted.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

³Select from approved departmental list or as approved in writing by advisor and department chair. *Note:* Six credit hours must be in business.

Notes:

1. ENGL 101 and 102 must be completed in the freshman year.
2. A minimum of 800 hours of construction experience will be required prior to graduation.

ENGLISH**Bachelor of Arts**

The purposes of a major in English are to help students acquire an understanding of our literary heritage; develop an appreciation and practical knowledge of the modes of literary expression, research, and criticism; improve the ability to write effectively and intelligently; gain insights into literature as a humane study; and prepare for advanced work in English language, literature, and related disciplines.

The program of study consists of courses stipulated in the map below,¹ which includes 31 semester hours of English, arranged as follows:

Group I—Seven credits from ENGL 190, 310, and 411 or 412.

Group II—Three credits from ENGL 405, 407, 408, 409, 410, 412, 413, 414.

Group III—Three credits from ENGL 406, 415, 416, 417, 418.

Group IV—Three credits from ENGL 422, 423, 424, 425.

Group V—Three credits from ENGL 400, 401, 435, 436, 440, (COMM) 491, (COMM) 492.

Group VI—Three credits from ENGL 353, 380, (HUM) 456, 482, 483.

Group VII—Three credits from ENGL 312, 345, 346, 348.

Group VIII—Six additional credits from 300- and 400-level courses, at least three credits from the 400 level.

Three 400-level credits must be from the department's variable list of "Senior Seminar" offerings.

Proficiency in composition is required of all English majors and minors. Those with writing problems must overcome them in the Writing Laboratory.

Electives are added as necessary to meet the minimum number of 130 hours required for graduation.

¹No course may be used to satisfy both major and minor requirements.

Freshman Year**First Semester**

- 3 - ENGL 101 Composition I
 - 3 - HIST 172 Western Civilization
 - 4 - Foreign Language Requirement¹
 - 3 - Mathematical Sciences Requirement²
 - 4 - Science Requirement³
- 17

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - HIST 173 Western Civilization
 - 4 - Foreign Language Requirement¹
 - 3 - Mathematical Sciences Requirement²
 - 4 - Science Requirement³
- 17

Sophomore Year**First Semester**

- 1 - ENGL 190 The Study of English
- 3 - Computer Skills Requirement⁴
- 3 - Fine Arts Requirement⁵
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement⁶
- 3 - Oral Communication Requirement¹

16

Second Semester

- 3 - ENGL 310 Writing About Literature
 - 3 - Foreign Language Requirement¹
 - 3 - Literature Requirement⁶
 - 6 - Major and Minor Areas
 - 3 - Philosophy/Religion Requirement⁷
- 18

Junior Year**First Semester**

- 3 - History Requirement²
 - 9 - Major and Minor Areas
 - 3 - Writing Intensive Requirement³
- 15

Second Semester

- 9 - Major and Minor Areas
 - 6 - Elective
- 15

Senior Year**First Semester**

- 3 - ENGL 496 Senior Seminar
 - 3 - Advanced Social Science Requirement⁸
 - 9 - Major and Minor Areas
 - 2 - Elective
- 17

Second Semester

- 9 - Major and Minor Areas
 - 6 - Elective
- 15

130 Total Semester Hours

¹The equivalent of two years (through 202) in the same foreign language is required.

²See advisor.

³See General Education Requirements.

⁴CP SC 101, 111, 120, or 210.

⁵A A H 101, 210, ENGL 357, HUM 301, 302, 306, MUSIC 210, 311, 415, 416, or THEA 210.

⁶ENGL 203, 204, 205, 206, 207, 208, or H210.

⁷PHIL 101, 102, 103, REL 101, or 102.

⁸Select any 300- or 400-level social science class.

HISTORY**Bachelor of Arts**

The recommended program consists of the required courses in the basic curriculum, plus GEOG 103 or 306 (with consent of instructor) and 30 additional credits in history. These additional credits must include two courses at the 400 level, one of which must be HIST 490, and at least one course each at the 300 or 400 level in United States, European, African, Asian, or Latin American history. Consult advisor for a detailed list. Additional electives are added as needed to meet the minimum of 30 semester hours required for graduation.

Pre-law students majoring in History should consult the departmental advisor for a recommended program.

Freshman Year**First Semester**

- 3 - ENGL 101 Composition I
 - 3 - HIST 172 Western Civilization
 - 3 - MTHSC 101 Introduction to Probability¹
 - 4 - Foreign Language Requirement
 - 4 - Science Requirement²
- 17

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - HIST 173 Western Civilization
 - 3 - MTHSC 102 Intro. to Mathematical Analysis¹
 - 4 - Foreign Language Requirement
 - 4 - Science Requirement²
- 17

Sophomore Year**First Semester**

- 3 - Computer Skills Requirement²
 - 3 - Foreign Language Requirement
 - 3 - Literature Requirement³
 - 9 - Major and Minor Areas
- 18

Second Semester

- 6 - Advanced Humanities Requirement⁴
 - 3 - Foreign Language Requirement
 - 3 - Literature Requirement³
 - 4 - Elective
- 16

Junior Year**First Semester**

- 9 - Major and Minor Areas
 - 3 - Writing Intensive Requirement²
 - 3 - Elective
- 15

Second Semester

- 12 - Major and Minor Areas
 - 3 - Oral Communication Requirement²
- 15

Senior Year**First Semester**

- 6 - Advanced Humanities Requirement⁴
 - 9 - Major and Minor Areas
 - 2 - Elective
- 17

Second Semester

- 9 - Major and Minor Areas
 - 6 - Elective
- 15

130 Total Semester Hours

¹Students may pursue alternate sequences such as the following: MTHSC 101 and 106 or 203; 102 and 207, or 106 and 108, 207, 301.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴See advisor.

LANDSCAPE ARCHITECTURE**Bachelor of Landscape Architecture**

As practicing design professionals, landscape architects base their land area design plans on very highly developed design standards and a keen awareness of the environmental and cultural context of the site. Landscape architects are active in the design of regional and city plans, urban designs, urban plazas, city parks and playgrounds, athletic fields, marinas, and other recreational areas. They design housing areas of all types, industrial and office parks, medical and academic campuses, parkways and bike ways, courtyards and backyards.

To succeed in landscape architecture, individuals must first enjoy creating something new or recreating something old. They must also see the study of landscape architecture as a way to improve the environment through an enlightened application of design on the land.

The five-year program leads to the professional degree, Bachelor of Landscape Architecture. Students can use the professional support course requirement to tailor the degree to an area of specialization such as construction, architecture, horticulture, business, city and regional planning, etc. Seniors who have been accepted into Clemson's graduate program in City and Regional Planning may fulfill the Professional Support Requirement with C R P courses, which will also count toward the requirements for the Master of City and Regional Planning Degree. Following completion of the Bachelor of Landscape Architecture degree, most states require a two- or three-year work experience before taking the professional license examination.

Freshman Year**First Semester**

- 3 - ENGL 101 Composition I
 - 3 - GEOG 101 Introduction to Geography
 - 3 - GEOL 101 Physical Geology¹
 - 1 - GEOL 103 Physical Geology Lab.¹
 - 3 - LARCH 151 Basic Design I
 - 1 - LARCH 153 Landscape Arch. Design Theory I
 - 3 - MTHSC 102 Intro. to Mathematical Analysis²
- 17

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - EX ST 301 Introductory Statistics²
 - 3 - GEOL 112 Earth Resources¹
 - 1 - GEOL 114 Earth Resources Lab.¹
 - 3 - LARCH 152 Basic Design II
 - 1 - LARCH 154 Landscape Arch. Des. Theory II
 - 3 - Computer Skills Requirement³
 - 1 - Elective
- 18

Sophomore Year**First Semester**

- 3 - A A H 101 Survey of Art and Arch. History I
 - 3 - GEOG 305 Cultural Geography
 - 6 - LARCH 251 Basic Design III
 - 3 - Art Requirement⁴
 - 3 - Oral Communication Requirement³
- 18

Second Semester

- 3 - A A H 102 Survey of Art and Arch. History II
- 3 - AG M 301 Soil and Water Conservation
- 6 - LARCH 252 Basic Design IV
- 3 - LARCH 262 Landscape Arch. Technology I
- 3 - Writing Intensive Requirement¹

18

Maymester

- 3 - Off Campus Travel Requirement²

Junior Year**First Semester**

- 3 - A A H 416 History of Landscape Architecture
- 2 - BE 221 Surveying for Soil and Water Res.
- 3 - HORT 303 Plant Materials
- 6 - LARCH 351 Landscape Arch. Design Studio I
- 3 - LARCH 362 Landscape Arch. Technology II

17

Second Semester

- 3 - HORT 101 Horticulture
- 4 - HORT 461 Problems in Landscape Design
- 6 - LARCH 352 Landscape Arch. Design II
- 3 - Computer-Aided Design Requirement⁶

16

Summer

- 1 - LARCH 293 Field Studies Internship or
- 1 - LARCH 493 Prof. Office Internship⁷

Senior Year⁸**First Semester**

- 6 - LARCH 451 Landscape Arch. Design III
- 3 - LARCH 462 Landscape Arch. Technology III
- 3 - Humanities Requirement E.1¹
- 3 - Elective

15

Second Semester

- 6 - LARCH 452 Landscape Arch. Design IV
- 3 - LARCH 581 Landscape Arch. Prof. Practice
- 6 - Elective

15

Summer

- 1 - LARCH 293 Field Studies Internship or
- 1 - LARCH 493 Prof. Office Internship⁷

Professional Year⁹**First Semester**

- 15 - Professional Support Requirement⁵

15

Second Semester

- 6 - LARCH 552 Landscape Arch. Design VI
- 7 - Professional Support Requirement⁵

13

167 Total Semester Hours

¹BIOL 101/102, 103/104, or PHYS 207/208 may be substituted.²MTHSC 106 may substitute for MTHSC 102. MTHSC 301 may substitute for EX ST 301.³See General Education Requirements.⁴Any 200-level ART course.⁵Select from approved departmental list or as approved in writing by advisor and department chair.⁶ARCH 426, 427, 428, LARCH 428, or other computer-aided design course as approved.⁷Up to six credit hours of LARCH 293 or 493 may be scheduled during summer sessions.⁸Exceptional students may be permitted to spend the spring semester at the Architecture Center in Charleston.⁹Exceptional students may be permitted to spend the fall semester at the Daniel Center in Genoa, Italy, or Barcelona, Spain.**LANGUAGE AND INTERNATIONAL HEALTH****Bachelor of Science**

The Bachelor of Science program in Language and International Health is jointly administered by the Department of Languages and the Department of Public Health Sciences in the College of Health, Education, and Human Development. Students acquire knowledge in public health theory and practice, including the history and philosophy of public health and medicine; the organization, management, and financing of health services; the social and behavioral aspects of health, epidemiology, health evaluation methods, and health communications. Students also acquire communicative competence in Spanish and a familiarity with Hispanic cultures, literatures, health environments, and multicultural issues.

The program requires study abroad and the completion of a practicum in a Spanish-speaking country. Graduates will be qualified to assume positions in a variety of settings including integrated hospital systems, consulting firms, managed care organizations, pharmaceutical companies, as well as multicultural community centers. They can also pursue graduate degrees in community health, epidemiology/biostatistics, health administration, health systems research, and Spanish.

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 101 Composition I
- 3 - HLTH 298 Human Health and Disease
- 1 - L&IT 127 Intro. to Language and Inter. Trade
- 3 - SPAN 202 Intermediate Spanish¹

17

Second Semester

- 4 - BIOL 104 General Biology II
- 3 - ENGL 102 Composition II
- 3 - HLTH 202 Introduction to Public Health
- 3 - SPAN 305 Inter. Spanish Conv. and Comp. I
- 3-4 Mathematical Sciences Requirement²

16-17

Sophomore Year**First Semester**

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 301 Statistical Theory and Methods
- 3 - SPAN 302 Inter. Spanish Grammar and Comp.
- 3 - Oral Communication Requirement³
- 3 - Social Science Requirement³

16

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - EN SP 200 Intro. to Environmental Science or
- 3 - NUTR 203 Principles of Human Nutrition
- 3 - HLTH 240 Determinants of Health Behavior
- 3 - SPAN 415 Spanish for Health Professionals
- 3 - Emphasis Area Requirement⁴

16

Junior Year**First Semester**

- 3 - ENGL 316 Writing and International Trade
- 3 - HLTH 303 Public Health Communication
- 3 - HLTH 480 Community Health Promotion
- 3 - SPAN 308 Hispanic World: Latin America or
- 3 - SPAN 318 Spanish Through Culture
- 3 - Emphasis Area Requirement⁴
- 3 - Elective

18

Second Semester

- 3 - HLTH 315 Social Epidemiology
- 3 - HLTH 490 Research and Evaluation Strategies for Public Health
- 3 - PSYCH 201 Introduction to Psychology
- 3 - SPAN 418 Technical Spanish for Health Management Professionals
- 3 - SPAN 435 Contemporary Hispanic Culture

15

Summer

- 3 - L&IT 400 L&IT Internship or
- 3 - L&IT 401 L&IT Practicum⁵

Senior Year**First Semester**

- 3 - HLTH 400 Epidemiology
- 3 - HLTH 440 Managing Health Service Org.
- 3 - HLTH 470 International Health
- 3 - SPAN 409 Comprehensive Writing in Spanish
- 3 - SPAN 419 Health and the Hispanic Comm.
- 3 - Elective

18

Second Semester

- 3 - HLTH 498 Improving Population Health
- 3 - PHIL 326 Science and Values
- 3 - SPAN 311 Survey of Spanish-American Lit.
- 3 - Emphasis Area Requirement⁴
- 4 - Elective

16

135-136 Total Semester Hours

¹Students are expected to have completed the first three semesters of elementary language in high school or Clemson summer sessions before the first semester of freshmen year.²Select from MTHSC 101, 102, 106.³See General Education Requirements.⁴See advisor. Select from the following emphasis areas: Health Systems or Community Development.⁵Mandatory student internship between junior and senior years in a Hispanic country.

LANGUAGE AND INTERNATIONAL TRADE

Bachelor of Arts

The Bachelor of Arts program in Language and International Trade expects students to acquire communicative competence in the foreign language; a familiarity with specific peoples, cultures, literatures, and business environments; and the knowledge and skills to pursue graduate studies or careers in business.

The Language and International Trade program combines foreign languages and international trade. Students choose one language concentration (Chinese, French, German, Japanese, or Spanish) and one professional option (Applied International Economics, International Trade, Textiles, or Tourism).

A summer internship between the junior and senior years gives students the opportunity to apply classroom learning to a business/industrial work environment. Language and International Trade majors are also encouraged to participate in Study Abroad programs to increase language proficiency.

The language component emphasizes speaking and writing skills, culture, civilization, and business/technical languages. The professional component emphasizes international marketing in areas important to the economy of the state and the nation.

In addition to the curriculum requirements outlined below, students will be required, as a condition of graduation, to pass a noncredit examination to determine their language competency. The examination will be taken in the student's last full semester at the University.

Freshman Year

First Semester

- 4 - CHIN 101 Elementary Chinese *or*
- 4 - JAPN 101 Elementary Japanese¹
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 101 Composition I
- 1 - L&IT 127 Intro. to Language and Inter. Trade
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Science Requirement²

14-18

Second Semester

- 4 - CHIN 102 Elementary Chinese *or*
- 4 - FR 102 Elementary French *or*
- 4 - GER 102 Elementary German *or*
- 4 - JAPN 102 Elementary Japanese *or*
- 4 - SPAN 102 Elementary Spanish
- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 207 Multivariable Calculus
- 4 - Science Requirement²

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¹Students in language concentrations other than Chinese and Japanese are expected to have completed the first semester of elementary language in high school or in a Clemson summer session before the first semester of the freshman year.

²See General Education Requirements.

APPLIED INTERNATIONAL ECONOMICS CONCENTRATION

Sophomore Year

First Semester

- 3 - AP EC 202 Agricultural Economics
- 3 - CHIN 201 Intermediate Chinese *or*
- 3 - FR 201 Intermediate French *or*
- 3 - GER 201 Intermediate German *or*
- 3 - JAPN 201 Intermediate Japanese *or*
- 3 - SPAN 201 Intermediate Spanish
- 3 - COMM 250 Public Speaking *or*
- 3 - COMM 251 Business and Prof. Speaking
- 3 - ECON 212 Principles of Macroeconomics
- 3 - Literature Requirement¹
- 3 - Elective

18

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - CHIN 202 Intermediate Chinese *or*
- 3 - FR 202 Intermediate French *or*
- 3 - GER 202 Intermediate German *or*
- 3 - JAPN 202 Intermediate Japanese *or*
- 3 - SPAN 202 Intermediate Spanish
- 3 - GEOG 103 World Regional Geography
- 3 - HIST 173 Western Civilization
- 6 - Elective

18

Junior Year

First Semester

- 3 - CHIN 305 Chinese Conv. and Comp. I *or*
- 3 - FR 305 Inter. French Conv. and Comp. I *or*
- 3 - GER 305 Inter. Ger. Conv. and Comp. *or*
- 3 - JAPN 305 Japanese Conv. and Comp. *or*
- 3 - SPAN 305 Inter. Span. Conv. and Comp. I
- 3 - ENGL 316 Writing and International Trade
- 3 - MKT 301 Principles of Marketing
- 3 - Advanced Social Science Requirement²
- 3 - Civilization Requirement¹

15

Second Semester

- 3 - CHIN 306 Chinese Conv. and Comp. II *or*
- 3 - FR 411 Adv. French Conv. and Comp. *or*
- 3 - GER 411 Studies in the German Lang. I *or*
- 3 - JAPN 411 Studies in the Japanese Lang. I *or*
- 3 - SPAN 411 Adv. Spanish Conv. and Comp.
- 3 - CHIN 316 Chinese for International Trade I *or*
- 3 - FR 316 French for International Trade I *or*
- 3 - GER 316 German for Inter. Trade I *or*
- 3 - JAPN 316 Japanese for Inter. Trade I *or*
- 3 - SPAN 316 Spanish for Inter. Trade I
- 3 - EX ST 462 Statistics Applied to Economics
- 3 - MKT 427 International Marketing
- 3 - Foreign Language 300/400-level Requirement²

15

Summer

- 3 - L&IT 400 L&IT Internship *or*
- 3 - L&IT 401 L&IT Practicum

Senior Year

First Semester

- 3 - AP EC 409 Commodity Futures Markets
- 3 - CHIN 416 Chinese for Inter. Trade II *or*
- 3 - FR 416 French for International Trade II *or*
- 3 - GER 416 German for Inter. Trade II *or*
- 3 - JAPN 416 Japanese for Inter. Trade II *or*
- 3 - SPAN 416 Spanish for Inter. Trade II
- 3 - MKT 423 Promotional Strategy
- 3 - Foreign Language 300/400-level Requirement²
- 2 - Elective

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Second Semester

- 3 - AP EC 420 World Agricultural Trade
- 3 - ECON 310 International Economy *or*
- 3 - ECON 412 International Microeconomics
- 3 - Fine Arts Requirement³
- 3 - Foreign Language 300/400-level Requirement²
- 3 - Elective

15

129-133 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

²Twelve hours in social sciences are required at the 300-400 level. This includes AP EC, ANTH, ECON, GEOG, HIST, PO SC, PSYCH, and SOC.

³Select from FR, JAPN, or SPAN 307; or GER, JAPN, or SPAN 308; or GER 309 or 413; or SPAN 435; or CHIN (ANTH) 418.

⁴A minimum of nine hours of 300-400-level foreign language courses is required. At least one course must be in literature. Advanced grammar is recommended for those exempting 100/200 levels. FR H418 and H439 and SPAN H438 and H439 may not be used to satisfy requirements for the French or Spanish Concentration.

⁵Three credits from A A H, MUSIC, or THEA (practica with the approval of the department chair).

INTERNATIONAL TRADE CONCENTRATION

Sophomore Year

First Semester

- 3 - CHIN 201 Intermediate Chinese *or*
- 3 - FR 201 Intermediate French *or*
- 3 - GER 201 Intermediate German *or*
- 3 - JAPN 201 Intermediate Japanese *or*
- 3 - SPAN 201 Intermediate Spanish
- 3 - COMM 250 Public Speaking *or*
- 3 - COMM 251 Business and Prof. Speaking
- 3 - ECON 211 Principles of Microeconomics
- 3 - HIST 173 Western Civilization
- 3 - Advanced Social Science Requirement¹
- 3 - Literature Requirement²

18

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - CHIN 202 Intermediate Chinese *or*
- 3 - FR 202 Intermediate French *or*
- 3 - GER 202 Intermediate German *or*
- 3 - JAPN 202 Intermediate Japanese *or*
- 3 - SPAN 202 Intermediate Spanish
- 3 - LAW 322 Legal Environment of Business
- 3 - Advanced Social Science Requirement¹
- 3 - Elective

15

Junior Year**First Semester**

- 3 - CHIN 305 Chinese Conv. and Comp. I *or*
- 3 - FR 305 Inter. French Conv. and Comp. I *or*
- 3 - GER 305 Inter. Ger. Conv. and Comp. *or*
- 3 - JAPN 305 Japanese Conv. and Comp. *or*
- 3 - SPAN 305 Inter. Span. Conv. and Comp. I
- 3 - ECON 310 International Economy *or*
- 3 - ECON 412 International Microeconomics
- 3 - ENGL 316 Writing and International Trade
- 3 - MKT 301 Principles of Marketing
- 3 - Civilization Requirement¹

15

Second Semester

- 3 - CHIN 306 Chinese Conv. and Comp. II *or*
- 3 - FR 411 Adv. French Conv. and Comp. *or*
- 3 - GER 411 Studies in the German Lang. I *or*
- 3 - JAPN 411 Studies in the Japanese Lang. I *or*
- 3 - SPAN 411 Adv. Spanish Conv. and Comp.
- 3 - CHIN 316 Chinese for International Trade I *or*
- 3 - FR 316 French for International Trade I *or*
- 3 - GER 316 German for Inter. Trade I *or*
- 3 - JAPN 316 Japanese for Inter. Trade I *or*
- 3 - SPAN 316 Spanish for Inter. Trade I
- 3 - MKT 427 International Marketing
- 3 - MTHSC 301 Statistical Theory and Meth. I *or*
- 3 - MTHSC 309 Intro. Business Statistics
- 3 - Foreign Language 300/400-level Requirement⁴
- 3 - Elective

18

Summer

- 3 - L&IT 400 L&IT Internship *or*
- 3 - L&IT 401 L&IT Practicum

Senior Year**First Semester**

- 3 - CHIN 416 Chinese for Inter. Trade II *or*
- 3 - FR 416 French for International Trade II *or*
- 3 - GER 416 German for Inter. Trade II *or*
- 3 - JAPN 416 Japanese for Inter. Trade II *or*
- 3 - SPAN 416 Spanish for Inter. Trade II
- 3 - FIN 306 Corporation Finance
- 3 - MGT 301 Principles of Management
- 3 - Advanced Social Science Requirement¹
- 3 - Foreign Language 300/400-level Requirement⁴

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Second Semester

- 3 - MGT 418 Management Information Systems
- 3 - MGT 424 Int. Transportation and Logistics
- 3 - Fine Arts Requirement¹
- 3 - Foreign Language 300/400-level Requirement⁴
- 6 - Elective

18

133-137 Total Semester Hours

¹Twelve hours in social sciences are required at the 300-400 level. This includes AP EC, ANTH, ECON, GEOG, HIST, PO SC, PSYCH, and SOC.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

³Select from FR, JAPN, or SPAN 307; or GER, JAPN, or SPAN 308; or GER 309 or 413; or SPAN 435; or CHIN (ANTH) 418.

⁴A minimum of nine hours of 300-400-level foreign language courses is required. At least one course must be in literature. FR H438 and H439 and SPAN H438 and H439 may not be

used to satisfy requirements for the French or Spanish Concentration. Advanced grammar is recommended for those exempting 100/200 levels.

⁵Three credits from A A H, MUSIC, or THEA (practicum with the approval of the department chair).

TEXTILES CONCENTRATION**Sophomore Year****First Semester**

- 3 - CHIN 201 Intermediate Chinese *or*
- 3 - FR 201 Intermediate French *or*
- 3 - GER 201 Intermediate German *or*
- 3 - JAPN 201 Intermediate Japanese *or*
- 3 - SPAN 201 Intermediate Spanish
- 3 - COMM 250 Public Speaking *or*
- 3 - COMM 251 Business and Prof. Speaking
- 3 - ECON 211 Principles of Microeconomics
- 3 - ECON 212 Principles of Macroeconomics
- 3 - TEXT 460 Textile Processes
- 3 - Literature Requirement¹
- 3 - Elective

18

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - CHIN 202 Intermediate Chinese *or*
- 3 - FR 202 Intermediate French *or*
- 3 - GER 202 Intermediate German *or*
- 3 - JAPN 202 Intermediate Japanese *or*
- 3 - SPAN 202 Intermediate Spanish
- 3 - HIST 173 Western Civilization
- 6 - Advanced Social Science Requirement²
- 3 - Elective

18

Junior Year**First Semester**

- 3 - CHIN 305 Chinese Conv. and Comp. I *or*
- 3 - FR 305 Inter. French Conv. and Comp. I *or*
- 3 - GER 305 Inter. Ger. Conv. and Comp. *or*
- 3 - JAPN 305 Japanese Conv. and Comp. *or*
- 3 - SPAN 305 Inter. Span. Conv. and Comp. I
- 3 - ENGL 316 Writing and International Trade
- 3 - MKT 301 Principles of Marketing
- 4 - TEXT 314 Chemical Processing of Textiles
- 3 - Civilization Requirement¹

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Second Semester

- 3 - CHIN 306 Chinese Conv. and Comp. II *or*
- 3 - FR 411 Adv. French Conv. and Comp. *or*
- 3 - GER 411 Studies in the German Lang. I *or*
- 3 - JAPN 411 Studies in the Japanese Lang. I *or*
- 3 - SPAN 411 Adv. Spanish Conv. and Comp.
- 3 - CHIN 316 Chinese for Inter. Trade I *or*
- 3 - FR 316 French for International Trade I *or*
- 3 - GER 316 German for Inter. Trade I *or*
- 3 - JAPN 316 Japanese for Inter. Trade I *or*
- 3 - SPAN 316 Spanish for Inter. Trade I
- 4 - TEXT 308 Apparel
- 3 - Foreign Language 300/400-level Requirement⁴
- 3 - Elective

16

Summer

- 3 - L&IT 400 L&IT Internship *or*
- 3 - L&IT 401 L&IT Practicum

Senior Year**First Semester**

- 3 - CHIN 416 Chinese for Inter. Trade II *or*
- 3 - FR 416 French for International Trade II *or*
- 3 - GER 416 German for Inter. Trade II *or*
- 3 - JAPN 416 Japanese for Inter. Trade II *or*
- 3 - SPAN 416 Spanish for Inter. Trade II
- 3 - MKT 427 International Marketing
- 3 - TEXT 422 Properties of Textile Structures
- 3 - Advanced Social Science Requirement¹
- 3 - Foreign Language 300/400-level Requirement⁴

15

Second Semester

- 3 - ECON 310 International Economy *or*
- 3 - ECON 412 International Microeconomics
- 3 - TEXT 475 Textile Marketing
- 3 - Fine Arts Requirement¹
- 3 - Foreign Language 300/400-level Requirement⁴
- 4 - Elective

16

133-137 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

²Twelve hours in social sciences are required at the 300-400 level. This includes AP EC, ANTH, ECON, GEOG, HIST, PO SC, PSYCH, and SOC.

³Select from FR, JAPN, or SPAN 307; or GER, JAPN, or SPAN 308; or GER 309 or 413; or SPAN 435; or CHIN (ANTH) 418.

⁴A minimum of nine hours of 300-400-level foreign language courses is required. At least one course must be in literature. FR H438 and H439 and SPAN H438 and H439 may not be used to satisfy requirements for the French or Spanish Concentration. Advanced grammar is recommended for those exempting 100/200 levels.

⁵Three credits from A A H, MUSIC, or THEA (practicum with the approval of the department chair).

TOURISM CONCENTRATION**Sophomore Year****First Semester**

- 3 - CHIN 201 Intermediate Chinese *or*
- 3 - FR 201 Intermediate French *or*
- 3 - GER 201 Intermediate German *or*
- 3 - JAPN 201 Intermediate Japanese *or*
- 3 - SPAN 201 Intermediate Spanish
- 3 - COMM 250 Public Speaking *or*
- 3 - COMM 251 Business and Prof. Speaking
- 3 - ECON 211 Principles of Microeconomics
- 3 - PRMT 342 Introduction to Tourism
- 3 - Literature Requirement¹
- 3 - Elective

18

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - CHIN 202 Intermediate Chinese *or*
- 3 - FR 202 Intermediate French *or*
- 3 - GER 202 Intermediate German *or*
- 3 - JAPN 202 Intermediate Japanese *or*
- 3 - SPAN 202 Intermediate Spanish
- 3 - HIST 173 Western Civilization
- 6 - Advanced Social Science Requirement²
- 3 - Elective

18

Junior Year**First Semester**

- 3 - CHIN 305 Chinese Conv. and Comp. I *or*
 - 3 - FR 305 Inter. French Conv. and Comp. I *or*
 - 3 - GER 305 Inter. Ger. Conv. and Comp. *or*
 - 3 - JAPN 305 Japanese Conv. and Comp. *or*
 - 3 - SPAN 305 Inter. Span. Conv. and Comp. I
 - 3 - ENGL 316 Writing and International Trade
 - 3 - MKT 301 Principles of Marketing
 - 3 - PRMT 343 Spatial Aspects of Tourist Behavior
 - 3 - Civilization Requirement¹
- 15

Second Semester

- 3 - CHIN 306 Chinese Conv. and Comp. II *or*
 - 3 - FR 411 Adv. French Conv. and Comp. *or*
 - 3 - GER 411 Studies in the German Lang. I *or*
 - 3 - JAPN 411 Studies in the Japanese Lang. I *or*
 - 3 - SPAN 411 Adv. Spanish Conv. and Comp.
 - 3 - CHIN 316 Chinese for International Trade *or*
 - 3 - FR 316 French for International Trade I *or*
 - 3 - GER 316 German for Inter. Trade I *or*
 - 3 - JAPN 316 Japanese for Inter. Trade I *or*
 - 3 - SPAN 316 Spanish for Inter. Trade I
 - 3 - Foreign Language 300/400-level Requirement⁴
 - 3 - PRMT 300/400-level Requirement²
 - 3 - Elective
- 15

Summer

- 3 - L&IT 400 L&IT Internship *or*
- 3 - L&IT 401 L&IT Practicum

Senior Year**First Semester**

- 3 - CHIN 416 Chinese for Inter. Trade II *or*
 - 3 - FR 416 French for International Trade II *or*
 - 3 - GER 416 German for Inter. Trade II *or*
 - 3 - JAPN 416 Japanese for Inter. Trade II *or*
 - 3 - SPAN 416 Spanish for Inter. Trade II
 - 3 - MKT 427 International Marketing
 - 3 - PRMT 444 Tour Planning and Operations
 - 3 - Advanced Social Science Requirement²
 - 3 - Foreign Language 300/400-level Requirement⁴
- 15

Second Semester

- 3 - ECON 310 International Economy *or*
 - 3 - ECON 412 International Microeconomics
 - 3 - PRMT 447 Perspectives on Inter. Travel
 - 3 - Fine Arts Requirement⁶
 - 3 - Foreign Language 300/400-level Requirement⁴
 - 6 - Elective
- 18

133-137 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.²Twelve hours in social sciences are required at the 300-400 level. This includes APEC, ANTH, ECON, GEOG, HIST, PO SC, PSYCH, and SOC.³Select from FR, JAPN, or SPAN 307; or GER, JAPN, or SPAN 308; or GER 309 or 413; or SPAN 435; or CHIN (ANTH) 418.⁴A minimum of nine hours of 300-400-level foreign language courses is required. At least one course must be in literature. FR H438 and H439 and SPAN H438 and H439 may not be used to satisfy requirements for the French or Spanish Concentration. Advanced grammar is recommended for those exempting 100/200 levels.⁵Three credits in PRMT at the 300-400 level, approved by the Language and International Trade Director.⁶Three credits from A A H, MUSIC, or THEA (practica with the approval of the department chair).**MODERN LANGUAGES****Bachelor of Arts**

The Bachelor of Arts degree in Modern Languages helps students acquire a basic use of the four language skills (listening, reading, speaking, and writing); a familiarity with specific peoples, cultures, and literatures; and the knowledge and foreign-language skills to pursue graduate studies or careers in education or business. All Modern Language majors are encouraged to travel/study abroad.

A student may elect a major in a single language, a double major in two languages, or a double major combining a language major with a Bachelor of Arts major outside the department. All Modern Language majors must complete the courses stipulated in the basic curriculum.

French—Requires FR 305 and 309 plus 24 additional credits in French at the 300-400 level. Six credits of literature courses, three credits of which must be at the 400 level, are required. FR H438 and H439 may not be used to satisfy requirements for the French major.

German—Requires 24 credits in German at the 300-400 level.

Spanish—Requires 30 credits at the 300-400 levels, of which nine credits must be at the 400 level. A minimum of six credit hours of literature, including one course at the 400 level, is also required. SPAN H438 and H439 may not be used to satisfy requirements for the Spanish major.

As a condition of graduation, students are required to pass a noncredit examination to determine their proficiency in the area. This examination is taken in the student's last full semester at the University.

Freshman Year**First Semester**

- 3 - ENGL 101 Composition I
 - 3 - HIST 172 Western Civilization
 - 3 - MTHSC 101 Introduction to Probability¹
 - 4 - Foreign Language Requirement
 - 4 - Science Requirement²
- 17

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - HIST 173 Western Civilization
 - 3 - MTHSC 102 Intro. to Mathematical Analysis¹
 - 4 - Foreign Language Requirement
 - 4 - Science Requirement²
- 17

Sophomore Year**First Semester**

- 3 - Computer Skills Requirement²
 - 3 - Fine Arts Requirement³
 - 3 - Foreign Language Requirement⁴
 - 3 - Literature Requirement⁴
 - 6 - Elective
- 18

Second Semester

- 3 - Advanced Social Science Requirement⁵
 - 3 - Foreign Language Requirement
 - 3 - Literature Requirement⁴
 - 7 - Elective
- 16

Junior Year**First Semester**

- 3 - Advanced Social Science Requirement⁵
 - 9 - Major and Minor Areas
 - 3 - Oral Communication Requirement²
- 15

Second Semester

- 12 - Major and Minor Areas
 - 3 - Writing Intensive Requirement²
- 15

Senior Year**First Semester**

- 9 - Major and Minor Areas
 - 8 - Elective
- 17

Second Semester

- 6 - Advanced Social Science Requirement²
 - 9 - Major and Minor Areas
- 15

130 Total Semester Hours

¹Students may pursue alternate sequences such as the following: MTHSC 101 and 106 or 203; 102 and 207; or 106 and 108, 207, or 301.²See General Education Requirements.³Three credits from A A H, MUSIC, or THEA (practica with the approval of the department chair).⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁵See advisor.**PHILOSOPHY****Bachelor of Arts**

The required course of study consists of the basic curriculum and either the standard Philosophy major, the Philosophy major with a Religious Studies Emphasis Area, or the Philosophy major with a Law, Liberty, and Justice Emphasis Area.

The standard Philosophy major consists of PHIL 315, 316, 401 or 402, and 24 additional credits in philosophy selected with the advice and consent of a departmental advisor; three of these 24 credits may be at the 100 level. Additional electives are added as needed to meet the minimum of 130 semester hours required for graduation.

The Philosophy major with a Religious Studies Emphasis Area consists of REL 101 or 102, 301, 302, 401 or 402, PHIL 303, 315, 316, 401 or 402, and nine additional credits selected with the advice and consent of a departmental advisor. Of these nine credits, three must be in philosophy and three must be in religion at the 300 level or above (PO SC 407 may count as a religion course). The remaining three credits may be in either religion or philosophy but must be at the 300 level or above. Students with this emphasis area must choose a minor other than religion. Additional electives are added as needed to meet the minimum of 130 semester hours required for graduation.

The Philosophy major with a Law, Liberty, and Justice Emphasis Area consists of PHIL 102, 304 or 320 or 321, 315, 316, 343, 401 or 402, HIST 328, 329, and nine additional credits in philosophy selected with the advice and consent of the departmental pre-law advisor. Students with this emphasis area are strongly advised to partially fulfill their advanced social science requirement by taking one or more of PO SC 432, 433. Additional electives are added as needed to meet the minimum of 130 semester hours required for graduation.

Pre-law and Pre-med students majoring in Philosophy should consult the departmental advisor for help in tailoring the program to their needs.

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 101 Introduction to Probability¹
- 4 - Foreign Language Requirement
- 4 - Science Requirement²

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis¹
- 4 - Foreign Language Requirement
- 4 - Science Requirement²

17

Sophomore Year

First Semester

- 3 - Foreign Language Requirement
- 3 - Literature Requirement¹
- 9 - Major and Minor Areas
- 3 - Oral Communication Requirement²

18

Second Semester

- 3 - Computer Skills Requirement²
- 3 - Foreign Language Requirement
- 3 - Literature Requirement¹
- 7 - Elective

16

Junior Year

First Semester

- 9 - Major and Minor Areas
- 3 - Writing Intensive Requirement²
- 3 - Elective

15

Second Semester

- 12 - Major and Minor Areas
- 3 - Elective

15

Senior Year

First Semester

- 6 - Advanced Social Sciences Requirement⁴
- 11 - Major and Minor Areas

17

Second Semester

- 6 - Advanced Social Sciences Requirement⁴
- 9 - Major and Minor Areas

15

130 Total Semester Hours

¹Students may pursue alternate sequences such as the following: MTHSC 101 and 106 or 203; 102 and 207; or 106 and 108, 207, or 301.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴See advisor.

PRODUCTION STUDIES IN PERFORMING ARTS

Bachelor of Arts

The Bachelor of Arts in Production Studies in Performing Arts is a distinctive program that combines the disciplines of music and theatre. The curriculum includes practical hands-on experience in performing arts production technologies with classes in performance, history, and theory. The curriculum allows students to choose from over 70 minors to tailor the program to their specific interests. The program integrates multidisciplinary and collaborative performing arts, teamwork, outreach, and service learning with traditional performance.

The degree is rooted in the liberal arts tradition with specific training in the performing arts. It provides the background for a number of career options or advanced studies, including graduate school, professional internships, and specialized postgraduate training.

The curriculum features a senior "capstone" project in which students spend their final year working as a production team, writing, composing, designing, marketing, and performing a final project.

To be considered for admission to this program, students must undergo an interview and/or audition with the Department of Performing Arts. Please note that students will not be eligible for admission to Clemson University in Production Studies in Performing Arts until this process is completed. Contact the department for specific requirements.

MUSIC CONCENTRATION

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 1 - MUSIC 153 Applied Music for Majors
- 3 - MUSIC 180 Intro. to Music Technology
- 3 - P A 101 Introduction to Performing Arts
- 4 - Foreign Language Requirement¹
- 1 - Large Ensemble Requirement²

15

Second Semester

- 3 - ENGL 102 Composition II
- 1 - MUSIC 154 Applied Music for Majors
- 3 - Computer Skills Requirement¹
- 4 - Foreign Language Requirement¹
- 1 - Large Ensemble Requirement²
- 3 - Mathematical Sciences Requirement¹

15

Sophomore Year

First Semester

- 3 - MUSIC 205 Music Theory I
- 1 - MUSIC 253 Applied Music for Majors
- 1 - P A 201 Performing Arts Seminar I
- 3 - Foreign Language Requirement¹
- 3 - Humanities Requirement E.1¹
- 1 - Large Ensemble Requirement²
- 3 - Mathematical Sciences Requirement¹
- 3 - Oral Communication Requirement¹

18

Second Semester

- 3 - MUSIC 206 Music Theory II
- 1 - MUSIC 254 Applied Music for Majors
- 1 - P A 279 Performing Arts Laboratory
- 3 - Foreign Language Requirement¹
- 1 - Large Ensemble Requirement²
- 3 - Social Science Requirement¹
- 3 - Writing Intensive Requirement¹

15

Junior Year

First Semester

- 3 - MUSIC 310 Survey of Music History
- 1 - MUSIC 353 Applied Music for Majors
- 1 - P A 301 Performing Arts Seminar II
- 3 - Humanities Requirement E.2¹
- 3 - Social Science Requirement¹
- 4 - Science Requirement¹
- 3 - Minor

18

Second Semester

- 1 - MUSIC 354 Applied Music for Majors
- 3 - MUSIC 480 Advanced Music Technology
- 1 - P A 279 Performing Arts Lab.
- 6 - Minor
- 4 - Science Requirement¹
- 3 - Elective

18

Senior Year

First Semester

- 1 - P A 401 Senior Project Research
- 3 - Minor
- 12 - Elective

16

Second Semester

- 3 - P A 402 Senior Project
- 3 - Minor
- 9 - Elective

15

130 Total Semester Hours

¹Four semesters of the same modern foreign language are required.

²Select from MUSIC 361 (maximum two credits in combination with MUSIC 364), 362, 363, 364 (maximum two credits in combination with MUSIC 361), 369, 370, 371, 372. Keyboard students must take a minimum of one hour each of MUSIC 323, Applied Organ, and Applied Canon.

³See General Education Requirements.

⁴A H 101, HUM 301, 302, 306, or THEA 210.

THEATRE CONCENTRATION

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
 - 3 - P A 101 Introduction to Performing Arts
 - 4 - Foreign Language Requirement¹
 - 3 - Mathematical Sciences Requirement²
 - 3 - Oral Communication Requirement³
-
- 16

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - THEA 278 Acting I
 - 1 - THEA 279 Theatre Laboratory
 - 3 - Computer Skills Requirement²
 - 4 - Foreign Language Requirement¹
 - 3 - Mathematical Sciences Requirement²
-
- 17

Sophomore Year

First Semester

- 1 - P A 201 Performing Arts Seminar I
 - 3 - THEA (ENGL) 347 Structure of Drama
 - 3 - THEA 377 Stagecraft
 - 3 - Foreign Language Requirement¹
 - 3 - Humanities Requirement E.1²
 - 3 - Social Science Requirement²
-
- 16

Second Semester

- 1 - P A 279 Performing Arts Laboratory
 - 3 - Foreign Language Requirement¹
 - 3 - Humanities Requirement E.1²
 - 3 - Social Science Requirement²
 - 3 - Theatre 300/400-level Requirement
 - 3 - Writing Intensive Requirement²
-
- 16

Junior Year

First Semester

- 1 - P A 301 Performing Arts Seminar II
 - 3 - THEA 315 Theatre History I
 - 3 - THEA 376 Stage Directing I
 - 4 - Science Requirement²
 - 3 - Minor
 - 3 - Elective
-
- 17

Second Semester

- 1 - P A 279 Performing Arts Laboratory
 - 3 - THEA 316 Theatre History II
 - 3 - Minor
 - 4 - Science Requirement²
 - 3 - Theatre 400-level Requirement
 - 3 - Elective
-
- 17

Senior Year

First Semester

- 1 - P A 401 Senior Project Research
 - 6 - Minor
 - 9 - Elective
-
- 16

Second Semester

- 3 - P A 402 Senior Project
 - 3 - Minor
 - 9 - Elective
-
- 15

130 Total Semester Hours

¹Four semesters of the same modern foreign language are required.

²See General Education Requirements.

³A A H 101, HUM 301, 302, 306, or MUSIC 210.

VISUAL ARTS

Bachelor of Fine Arts

The Bachelor of Fine Arts degree is the recognized professional undergraduate degree in the visual arts. The program in Visual Arts prepares students interested in a balanced curriculum of academic coursework and studio art and art history courses for careers in studio-related areas of the visual arts.

Students begin to concentrate their studio coursework in a specific area of the visual arts—ceramics, drawing, painting, photography, printmaking, or sculpture—in the junior year in preparation for the senior studio experience. The program is structured so that the concentrated studio experiences in the junior year allow students opportunities to explore and develop concepts and skills that lead to a cohesive body of artwork in the senior year and a portfolio for professional application or graduate study.

Freshman Year

First Semester

- 3 - A A H 101 Survey of Art and Arch. History I
 - 3 - ART 151 Foundations in 2D Art
 - 1 - ART 153 Orientation to Visual Arts I
 - 3 - ART 205 Beginning Drawing
 - 3 - ENGL 101 Composition I
 - 3 - MTHSC 101 Introduction to Probability
-
- 16

Second Semester

- 3 - A A H 102 Survey of Art and Arch. History II
 - 3 - ART 152 Foundations in 3D Art
 - 1 - ART 154 Orientation to Visual Arts II
 - 3 - ART 207 Beginning Painting
 - 3 - ENGL 102 Composition II
 - 3 - MTHSC 102 Intro. to Mathematical Analysis
-
- 16

Sophomore Year

First Semester

- 3 - A A H 205 History and Theory of Art I
 - 3 - ART 209 Beginning Sculpture
 - 3 - ART 211 Beginning Printmaking
 - 3 - Computer Skills Requirement¹
 - 4 - Science Requirement¹
-
- 16

Second Semester

- 3 - A A H 206 History and Theory of Art II
 - 3 - ART 213 Beginning Photography
 - 3 - ART 217 Beginning Ceramics
 - 3 - ART 305 Drawing
 - 4 - Science Requirement¹
-
- 16

Junior Year

First Semester

- 3 - A A H 305 Contemporary Art History
 - 6 - Art 300/400 Requirement
 - 3 - Studio Requirement¹
 - 3 - Writing Intensive Requirement¹
 - 3 - Elective
-
- 18

Second Semester

- 6 - Art 300/400 Requirement
 - 3 - Humanities Requirement E.1¹
 - 3 - Oral Communication Requirement¹
 - 3 - Studio Requirement¹
 - 3 - Elective
-
- 18

Senior Year

First Semester

- 5 - ART 471 BFA Senior Studio I
 - 3 - Art 300/400 Requirement
 - 3 - Social Science Requirement¹
 - 3 - Studio Requirement²
 - 3 - Elective
-
- 17

Second Semester

- 5 - ART 472 BFA Senior Studio II
 - 3 - Art 300/400 Requirement
 - 3 - Social Science Requirement¹
 - 3 - Studio Requirement²
 - 3 - Elective
-
- 17

134 Total Semester Hours

¹See General Education Requirements.

²All ART courses and other courses approved by advisor.

MINORS

Following are minors acceptable for students in the College of Architecture, Arts, and Humanities. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Students in Landscape Architecture are not eligible to claim a minor.

Accounting
 Adult/Extension Education
 Aerospace Studies
 African American Studies
 Agricultural Business Management
 Agricultural Mechanization and Business
 Anthropology
 Athletic Leadership
 Beef Cattle Production
 Biochemistry
 Bioengineering
 Biological Sciences
 Business Administration
 Chemistry
 Cluster
 Communication Studies
 Communications
 Computer Science
 Crop and Soil Environmental Science
 Early Intervention—*not open to Visual Arts majors*
 East Asian Studies
 Economics
 Education
 English
 Entomology
 Entrepreneurship
 Environmental Engineering
 Environmental Science and Policy
 Film Studies
 Financial Management
 Fine Arts
 Food Science
 Forest Products
 Forest Resource Management
 Geography
 Geology
 Great Works
 Health Science
 History

Horse Production
 Horticulture
 Human Resource Management
 International Politics
 Legal Studies
 Management
 Mathematical Sciences
 Microbiology
 Military Leadership
 Modern Languages—*not open to Language and International Trade majors*
 Music
 Natural Resource Economics
 Operations Management
 Packaging Science
 Parks, Recreation, and Tourism Management
 Philosophy
 Physics
 Plant Pathology
 Political Science
 Poultry Science
 Psychology
 Public Policy
 Religion—*not open to Philosophy—Religious Studies majors*
 Science and Technology in Society
 Screenwriting
 Sociology
 Spanish-American Area Studies
 Textiles
 Theatre
 Turfgrass
 Urban Forestry
 Wildlife and Fisheries Biology
 Women's Studies
 Writing

See pages 35-38 for details.

COLLEGE OF BUSINESS AND BEHAVIORAL SCIENCE

The College of Business and Behavioral Science includes the School of Accountancy and Legal Studies and the Departments of Aerospace Studies, Economics, Finance, Graphic Communications, Management, Marketing, Military Leadership, Political Science, Psychology, Sociology, and the MBA Program.

The mission of the College is

- to develop leaders who are exceptionally qualified, globally competitive, entrepreneurially spirited, and committed to the betterment of society;
- to produce scholarly research that is relevant to our stakeholders; and
- to support professional and public service activities that contribute to economic, social, and intellectual development.

ROTC PROGRAMS

Aerospace Studies (AFROTC)

Air Force Reserve Officer Training Corps provides students the opportunity to earn a commission as second lieutenants while pursuing a bachelor's degree. The program includes courses in air power history, written and oral communications, leadership and management, and political science. Air Force ROTC is designed to meet the need for dedicated and professional leaders in the active duty Air Force. Additional information is available from the Department of Aerospace Studies.

Military Leadership (Army ROTC)

Army Reserve Officer Training Corps is all about leadership. It allows students the opportunity to become Army officers in the Reserves, National Guard, or active Army. The first two years of the program are open to all students. During the freshman year, the focus is on learning individual leadership skills such as time management, leadership character, values, setting goals, and conducting meetings. The sophomore year emphasizes teamwork, team leading, communication/briefings, decision making, and organizational culture, vision, and team values. Juniors primarily learn planning and conducting training for large groups and are evaluated in leadership exercises. Seniors focus on organizational leadership. They plan and run the 170+ person organization, conduct individual counseling, and evaluate the juniors' leadership exercises. A minor in Military Leadership can be earned by completing the program. Enrollment requires no military obligation until the sophomore year for those on an Army scholarship or the junior year for those without a scholarship. Additional information is available from the Military Leadership Department.

SOCIAL AND BEHAVIORAL SCIENCE PROGRAMS

Bachelor of Arts degrees are offered in Economics, Political Science, Psychology, and Sociology; Bachelor of Science degrees are also offered in Political Science, Psychology, and Sociology. These programs are designed to meet the needs of students seeking a broad general education as preparation for intelligent citizenship, commercial and industrial life, government service, research, and teaching. These curricula also provide an excellent background for the study of law, journalism, and medicine.

To achieve depth as well as breadth in the educational experience, students select a major consisting of at least 24 credit hours from courses above the sophomore level. Students also choose a minor consisting of at least 15 additional credit hours. Courses satisfying a student's major may not also be included in the minor. See page 76 for acceptable minors.

Students in bachelor of arts programs who plan to teach in public schools may elect education courses required for certification by the South Carolina State Department of Education. Such courses are to be approved by their own department advisors.

BUSINESS PROGRAMS

Bachelor of science programs are offered in Accounting, Economics, Financial Management, Graphic Communications, Industrial Management, Management, and Marketing. With the exception of Graphic Communications, these programs share a common curriculum the first year, allowing the student maximum flexibility in choosing an appropriate major. These degrees, with the exception of Economics, are accredited by the AACSB International (Association to Advance Collegiate Schools of Business). The curricula prepare students for a variety of careers and furnish an education that recognizes the need for an understanding of the basic principles of science, appreciation for the nature of human interaction, and the comprehension of the economic, political, and social environment.

Pre-Business Program

The Pre-Business Program provides students planning to earn Bachelor of Science degrees in Accounting, Economics, Financial Management, Industrial Management, Management, and Marketing with a sound academic preparation for a variety of careers in business. All business students must complete a common curriculum for the freshman year and have a cumulative grade-point ratio of 2.0 or higher before being admitted into Accounting, Economics, Financial Management, Industrial Management or Management; students must have a cumulative grade-point ratio of 3.0 or higher before being admitted into Marketing. All new business students (including transfer students) are admitted into the Pre-Business Program until all classes in the freshman curriculum are satisfactorily completed and the grade-point ratio requirement is met.

Freshman Curriculum

First Semester

- 3 - ECON 211 Principles of Microeconomics
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 3 - Option List¹
- 4 - Science Requirement²

16

Second Semester

- 3 - ECON 212 Principles of Macroeconomics
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus
- 3 - Option List¹
- 4 - Science Requirement²

16

OPTION LIST

- 3 - PSYCH 201 Introduction to Psychology *or*
- 3 - SOC 201 Introduction to Sociology
- 3 - Computer Skills Requirement³
- 6 - Humanities Requirement E.1 and E.2⁴
- 6 - International Studies Requirement¹
- 3 - Leadership Requirement¹
- 3 - Oral Communication Requirement¹

24

¹See advisor.

²See General Education Requirements.

Admission to Business Degree Programs

To be eligible for admission into the business degree program in Accounting, BS in Economics, Financial Management, Industrial Management, or Management, students must have completed the 32 credit hours outlined in the freshman curriculum with a cumulative grade-point ratio of 2.0 or higher. Students wishing to enter the Marketing Program must have completed the Pre-Business program with a cumulative grade-point ratio of 3.0 or higher and must obtain permission of the department chair. Students should initiate a change-of-major request after completion of the Freshman Curriculum. Students who fail to meet the requirements for admission to a degree-granting business program may remain in Pre-Business until those requirements are met, but only until 64 semester hours of coursework have been completed. Students who exceed 64 credit hours and still do not meet the requirements for admission into a degree program must declare another major. Students petitioning for admission into a business degree program will follow the curriculum in effect at the time of the change.

ACCOUNTING

Bachelor of Science

The program leading to the Bachelor of Science degree in Accounting prepares students for careers as professional accountants. Students completing this program are well prepared to enter many accounting career fields as well as to continue study at the graduate level.

Students planning to become Certified Public Accountants should note that the requirements to sit for the CPA examination in South Carolina include 150 hours of collegiate education and completion of a bachelor's degree. Other states have, or will soon have, similar requirements. The faculty of the School of Accountancy and Legal Studies believes these requirements are best met with a bachelor's degree in Accounting and completion of the Master of Professional Accountancy (MPAcc) degree program. The MPAcc program also enhances the preparation of students pursuing accounting careers in areas of specialization such as assurance and management services and taxation.

Admission to the MPAcc program is separate from admission to the undergraduate program. It is based on the student's undergraduate record and score on the Graduate Management Admissions Test (GMAT). For information, contact the School of Accountancy and Legal Studies, 301 Sirrine Hall.

In addition to accounting and business courses, approximately one-half of the Bachelor of Science curriculum is devoted to English, public speaking, mathematics, natural and social sciences, and the humanities. Thus, students in the accounting program obtain a broad-based education that not only gives them accounting expertise but also contributes to their proficiency in analytical, communication, and interpersonal skills. Along with the general business accreditation held by the College, the degree programs offered by the School of Accountancy and Legal Studies are separately accredited by AACSB International, the only accrediting agency for accounting programs.

Sophomore Year

First Semester

- 3 - EX ST 301 Introductory Statistics *or*
 - 3 - MTHSC 301 Stat. Theory and Methods I *or*
 - 3 - MTHSC 309 Intro. Business Statistics
 - 3 - MGT 301 Principles of Management
 - 9 - Option List¹
 - 1 - Elective
-

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 1 - ACCT 204 Accounting Procedures
 - 3 - CP SC 220 Microcomputer Applications
 - 9 - Option List¹
-

Junior Year

First Semester

- 3 - ACCT 311 Intermediate Financial Acct. I
 - 3 - ACCT 322 Accounting Information Systems
 - 3 - ENGL 304 Business Writing
 - 3 - FIN 311 Financial Management I
 - 3 - Fine Arts Requirement²
 - 1 - Elective
-

Second Semester

- 3 - ACCT 312 Intermediate Financial Acct. II
 - 3 - ACCT 340 Internal Auditing Theory *or*
 - 3 - ACCT 415 Auditing¹
 - 3 - FIN 312 Financial Management II
 - 3 - LAW 322 Legal Environment of Business
 - 3 - PHIL 344 Business Ethics
 - 1 - Elective
-

Senior Year

First Semester

- 3 - ACCT 303 Cost Accounting
 - 3 - ACCT 313 Intermediate Financial Acct. III
 - 3 - ACCT 404 Individual Taxation *or*
 - 3 - ACCT 406 Business Taxation¹
 - 3 - MKT 301 Principles of Marketing
 - 3 - International Business Requirement¹
 - 1 - Elective
-

Second Semester

- 15 - Senior Option (see below)
- 15
- 127 Total Semester Hours

Senior Option

(Completion of one of the following options is required.)

INTERNSHIP OPTION

Senior Year

Second Semester

- 3 - ACCT 399 Internship in Accounting³
-

First Summer Session

- 3 - MGT 415 Business Strategy
 - 3 - Elective
-

Second Summer Session

- 3 - ACCT 410 Budgeting and Executive Control
 - 3 - Elective
-

BUSINESS MANAGEMENT COURSE OPTION

Senior Year

Second Semester

- 3 - ACCT 410 Budgeting and Executive Control
 - 3 - MGT 415 Business Strategy
 - 3 - Business Management Requirement⁶
 - 6 - Elective
-

¹ Select from Option List in Pre-Business Curriculum

² A A 11 210, MUSIC 210, or THEA 210

³ Students planning to pursue the Master of Professional Accountancy degree program should take ACCT 404 and 415. Students planning to work in industry upon completion of the degree program should take ACCT 340 and 406.

⁴ ECON 310, FIN 411, LAW 400, MGT 413, or MKT 417

⁵ Alternately, an internship may be completed in the summer between junior and senior years with ACCT 410, MGT 415, and six hours of electives completed in the second semester of the senior year.

⁶ MGT 305, 307, 310, 312, (F I 1) 315, 317, 400 or 412.

Note: At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MGT, and MKT must be taken at Clemson University.

ECONOMICS

A bachelor's degree in Economics provides a thorough understanding of business, society, and public policy and prepares students for a wide range of careers. By combining general education courses and a strong course of study in economics, students can prepare for graduate studies in business, law, or any of the social sciences as well as for careers in business and government.

The Department of Economics offers two undergraduate degree paths. The Bachelor of Arts degree emphasizes foreign language skills and offers students maximum freedom to tailor their course of study to their specific interests and career goals. A broad choice of minors is available for this program. The Bachelor of Arts program requires 30 credit hours in economics, which should be satisfied by completing ECON 211, 212, and 24 credits of coursework above the sophomore level. Bachelor of Arts majors must complete ECON 314 and 315. ECON 405 is strongly recommended but not required.

The Bachelor of Science program emphasizes business applications. It requires 31 credit hours in economics, which should be satisfied by completing ECON 211, 212, and 25 credits of coursework above the sophomore level. Bachelor of Science majors must complete ECON 405 in addition to 314 and 315.

Minors

A minor field is required of students in both the Bachelor of Arts and the Bachelor of Science degree programs. Economics majors may choose, in consultation with their advisors, any University-approved minor. (See page 76.)

Students who wish to combine the curriculum in Economics with secondary-school teaching should take the degree in Education with a teaching area in Economics. The courses taken will be those required for teaching certification as specified by the South Carolina Department of Education as well as those required for an Economics major.

Graduate Study

The Department of Economics allows students to count up to 12 hours of graduate credit (800-level courses) toward both the bachelor's and master's degrees. Students participating in this program must have a minimum grade-point ratio of 3.4 and be admitted to the Graduate School prior to registering for graduate courses. Details of the suggested curriculum and program information are available from the Department of Economics.

Bachelor of Arts**Freshman Year****First Semester**

- 3 - ECON 211 Principles of Microeconomics
- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis¹
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17**Second Semester**

- 3 - ECON 212 Principles of Macroeconomics
- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus¹
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17**Sophomore Year****First Semester**

- 3 - CP SC 120 Intro. to Information Technology
- 3 - ECON 314 Intermediate Microeconomics
- 3 - MTHSC 301 Statistical Theory and Methods I
- 3 - Foreign Language Requirement²
- 3 - Literature Requirement⁴
- 1 - Elective

16**Second Semester**

- 3 - ECON 315 Intermediate Macroeconomics
- 3 - HIST 173 Western Civilization
- 3 - Foreign Language Requirement²
- 3 - Literature Requirement⁴
- 4 - Elective

16**Junior Year****First Semester**

- 3 - COMM 250 Public Speaking *or*
- 3 - COMM 251 Business and Prof. Speaking
- 3 - Major Requirement¹
- 3 - Minor
- 3 - Writing Intensive Requirement¹
- 4 - Elective

16**Second Semester**

- 3 - Major Requirement¹
- 6 - Minor
- 7 - Elective

16**Senior Year****First Semester**

- 6 - Major Requirement¹
- 3 - Minor
- 3 - Elective

15**Second Semester**

- 6 - Major Requirement¹
- 9 - Elective

15

128 Total Semester Hours

¹MTHSC 106 and 108 may be substituted for MTHSC 102 and 207, respectively, and one or two elective hours. Students who choose this option are encouraged to take MTHSC 206 as well.

²Two years of the same modern language are required.

³See General Education Requirements.

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁵ECON 301, 302, (MGT) 306, 309, 310, and 324 may not be used to satisfy the Major Requirement.

Note: Students seeking teaching certification will be required to complete more than 128 semester hours.

ECONOMICS**Bachelor of Science****Sophomore Year****First Semester**

- 3 - ECON 314 Intermediate Microeconomics
- 3 - EX ST 301 Introductory Statistics *or*
- 3 - MTHSC 301 Stat. Theory and Methods I *or*
- 3 - MTHSC 309 Intro. Business Statistics
- 3 - MGT 301 Principles of Management
- 6 - Option List¹
- 1 - Elective

16**Second Semester**

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - ECON 315 Intermediate Macroeconomics
- 9 - Option List¹
- 1 - Elective

16**Junior Year****First Semester**

- 3 - ACCT 202 Managerial Accounting Concepts
- 3 - FIN 306 Corporation Finance²
- 3 - Minor
- 3 - Option List¹
- 3 - Elective

15**Second Semester**

- 4 - ECON 405 Introduction to Econometrics
- 3 - Major Requirement¹
- 3 - Minor
- 3 - Writing Intensive Requirement⁴
- 3 - Elective

16**Senior Year****First Semester**

- 6 - Major Requirement¹
- 6 - Minor
- 6 - Elective

18**Second Semester**

- 6 - Major Requirement¹
- 3 - Minor
- 6 - Elective

15

128 Total Semester Hours

¹Select from Option List in Pre-Business curriculum.

²Students who complete a minor in Financial Management must complete three hours of electives to replace the FIN 306 requirement in the Economics major.

³ECON 301, 302, (MGT) 306, 309, 310, and 324 may not be used to satisfy the Major Requirement.

⁴See General Education Requirements.

Note: At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MGT, and MKT must be taken at Clemson University.

FINANCIAL MANAGEMENT**Bachelor of Science**

The Bachelor of Science in Financial Management program is designed to develop an understanding of financial markets in the contemporary economy, the operation of financial institutions, and the financial management of business operations. The curriculum prepares students for careers in such areas as banking, corporate financial management, financial planning and services, insurance, and real estate. Governments of all levels also employ finance graduates in many of their divisions. The curriculum also provides excellent preparation for students interested in graduate studies or law school.

The core of the curriculum provides a broad range of subjects with an emphasis on technical and communication skills. Students then have the flexibility to tailor courses to their own needs by choosing emphasis areas that will enhance career preparation in specific areas of finance. Students who complete a specific set of courses are eligible to sit for the certified financial planner (CFP®) examination.

Sophomore Year**First Semester**

- 3 - EX ST 301 Introductory Statistics *or*
- 3 - MTHSC 301 Stat. Theory and Methods I *or*
- 3 - MTHSC 309 Intro. Business Statistics
- 3 - MGT 301 Principles of Management
- 9 - Option List¹
- 1 - Elective

16**Second Semester**

- 3 - ACCT 201 Financial Accounting Concepts
- 1 - ACCT 204 Accounting Procedures
- 3 - MGT 310 Intermediate Business Statistics
- 9 - Option List¹

16**Junior Year****First Semester**

- 3 - ACCT 311 Intermediate Financial Acct. I
- 3 - CP SC 220 Microcomputer Applications
- 3 - FIN 311 Financial Management I
- 3 - LAW 312 Commercial Law *or*
- 3 - LAW 322 Legal Environment of Business
- 3 - Writing Intensive Requirement²

15**Second Semester**

- 3 - ACCT 312 Intermediate Financial Acct. II
- 3 - FIN 305 Investment Analysis
- 3 - FIN 307 Principles of Real Estate
- 3 - FIN 312 Financial Management II
- 3 - MKT 301 Principles of Marketing
- 3 - Elective

18**Senior Year****First Semester**

- 3 - ACCT 303 Cost Accounting
- 3 - FIN 308 Financial Institutions and Markets
- 9 - Emphasis Area¹

15

Second Semester

- 3 - MGT 415 Business Strategy
- 6 - Emphasis Area¹
- 6 - Elective

15

127 Total Semester Hours

¹Select from Option List in Pre-Business curriculum.²See General Education Requirements.

³Fifteen credit hours from one of the following emphasis areas. An emphasis area should be selected before the end of the junior year in consultation with the departmental advisor:

Corporate Finance—FIN 402, 404, 411; plus two courses from FIN 304, 399 (three credits), 405, 406, 408, or two accounting courses. (See Note 3.)

Financial Planning—ACCT 404, 408, FIN 304, 405, 409.

Financial Services—FIN 405, 406, 408, 411, and one course from FIN 304, 399 (three credits), 417.

Real Estate—FIN 415, 416, 417, LAW 333, plus one course from C.R.P. 401, FIN 399, LAW 405.

Notes:

1. Financial Management majors are required to have a grade-point ratio of at least 2.0 in all FIN-designated courses to graduate. Only the last grade for courses that are repeated counts for computing this grade-point ratio.
2. At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MGT, and MKT must be taken at Clemson University.
3. Accounting courses may be selected from any 300- or 400-level course offered by the School of Accountancy. Credit may not be received for both ACCT 303 and 307.

GRAPHIC COMMUNICATIONS

Bachelor of Science

The Bachelor of Science degree in Graphic Communications prepares students for professional careers in printing, publishing, packaging, and related industries. The core curriculum assures graduates of having the skills and knowledge required by most entry-level jobs. The major requirements allow each student to select courses which enhance career preparation in specific segments of graphic communications. Coursework is heavily oriented around individual laboratory performance which stresses the development of problem-solving skills in a broad cross-section of manufacturing areas. Applications include all major processes and a variety of industry segments, including commercial printing, publishing, package production, specialty printing, and industrial applications of printing technology beyond communications. The most common career opportunities are in printing management, production planning and supervision, and commercial and technical sales.

The Graphic Communications program is designed to be completed in four years (eight semesters and one or two summers). While students must take one internship during a fall or spring semester, one or two summers are typically used to make up for that semester. The department schedules courses in summers for that purpose. Taking a reduced load per term or other circumstances could extend the time to meet graduation requirements.

Policy on Advancement in Graphic Communications

Graphic Communications majors must achieve a C or better in prerequisite G C courses before enrolling in the next level G C course. Registration priority is given to those students for whom the course is a requirement.

Change of Major into Graphic Communications

Students who change majors into Graphic Communications after one or more semesters at Clemson must have a 2.0 minimum cumulative grade-point ratio in courses taken at Clemson or must first have earned a B or better in G C 104.

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 1 - G C 101 Orientation to Graphic Comm.
- 3 - PSYCH 201 Introduction to Psychology
- 3 - THRD 180 Intro. to Technical Drawing and Computer-Aided Drafting
- 4 - Approved Laboratory Science Requirement¹
- 3 - Mathematical Sciences Requirement²

17

Second Semester

- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics or
 - 3 - MTHSC 203 Elem. Statistical Inference or
 - 3 - MTHSC 301 Stat. Theory and Methods I
- 4 - G C 104 Graphic Communications I
- 4 - Approved Laboratory Science Requirement¹

17

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - G C 207 Graphic Communications II
- 3 - G C 215 Photo. and Digital Imaging Tech.
- 3 - MGT 218 Mgt. Personal Computer Appl.
- 3 - MGT 301 Principles of Management
- 2 - PKGSC 102 Intro. to Packaging Science

17

Second Semester

- 3 - ACCT 202 Managerial Acct. Concepts
- 3 - COMM 250 Public Speaking or
 - 3 - COMM 251 Business and Prof. Speaking
- 3 - ECON 211 Principles of Microeconomics
- 3 - G C 245 Graphic Comm. Mechanical Systems
- 4 - G C 310 Alternative Approaches to Imaging

16

Summer

- 0 - CO-OP 101 Cooperative Education^{1,4}
- 1 - G C 350 Graphic Comm. Internship^{1,4}

1

Junior Year

First Semester

- 3 - EN SP 200 Intro. to Environmental Science
- 2 - G C 405 Package and Specialty Printing
- 2 - G C 406 Package and Specialty Printing Lab
- 3 - MGT 307 Personnel Management or
 - 3 - PSYCH 364 Industrial Psychology
- 3 - Literature Requirement¹
- 4 - Major Requirement¹

17

Second Semester

- 3 - ENGL 314 Technical Writing
- 5 - G C 440 Commercial Printing
- 3 - G C 446 Ink and Substrates
- 3 - MKT 301 Principles of Marketing
- 3 - Humanities Requirement E.2²

17

Summer

- 0 - CO-OP 102 Cooperative Education¹
- 1 - G C 450 Graphic Comm. Internship^{1,4}

1

Senior Year

First Semester

- 4 - G C 444 Current Developments and Trends in Graphic Communications
- 3 - THRD 360 Ind. Organizations and Safety
- 6 - Major Requirement³
- 3 - Elective

16

Second Semester

- 3 - G C 448 Planning and Controlling Printing Functions
- 2 - G C 480 Senior Seminar in Graphic Comm.
- 4 - Major Requirement⁴
- 7 - Elective

16

135 Total Semester Hours

¹Must include a two-semester sequence from chemistry or physics.²See General Education Requirements.³One internship must be in a fall or spring semester. (Summer at least 12 weeks; fall/spring 15 weeks minimum.)⁴Required before any required G C 400-level courses may be taken.⁵ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁶Must be approved by advisor prior to registration. A list of acceptable major requirements is available in the Graphic Communications Office.⁷G C 455 will not substitute for G C 450.

INDUSTRIAL MANAGEMENT

Bachelor of Science

The Bachelor of Science degree in Industrial Management prepares students for management challenges in manufacturing, production planning, inventory control, quality assurance, and service operations. Students receive a broad-based education in business, but particular emphasis is placed on systems, theories, and issues dealing with the production of goods and services. The program is particularly relevant in today's economic environment, where improvements in productivity and quality are essential to meet the growing challenges of foreign producers. In addition to jobs in manufacturing management, graduates in Industrial Management are sometimes sought for positions as project directors by government agencies and research centers. Financial institutions have found the Industrial Management graduate well prepared for internal operations management as well as for liaison positions dealing with manufacturing companies as bank customers. The Industrial Management program is accredited by AACSB International and has received a special commendation for excellence from the South Carolina Commission on Higher Education.

Sophomore Year

First Semester

- 3 - EX ST 301 Introductory Statistics or
 - 3 - MTHSC 301 Stat. Theory and Methods I or
 - 3 - MTHSC 309 Intro. Business Statistics
 - 3 - MGT 301 Principles of Management¹
 - 9 - Option List²
 - 1 - Elective
-
- 16

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 3 - MGT 218 Mgt. Personal Computer Appl.
 - 9 - Option List²
 - 1 - Elective
-
- 16

Junior Year

First Semester

- 3 - ACCT 202 Managerial Accounting Concepts
 - 3 - LAW 322 Legal Environment of Business
 - 3 - MGT 310 Intermediate Business Statistics¹
 - 3 - MKT 301 Principles of Marketing
 - 3 - Writing Intensive Requirement³
 - 2 - Elective
-
- 17

Second Semester

- 3 - ACCT 307 Managerial Accounting
 - 3 - FIN 306 Corporation Finance
 - 3 - MGT 305 Economics of Transportation¹ or
 - 3 - MGT 317 Logistics Management¹
 - 3 - MGT 312 Decision Models for Management¹
 - 3 - MGT 390 Operations Management¹
 - 2 - Elective
-
- 17

Senior Year

First Semester

- 3 - ECON (MGT) 306 Managerial Economics¹
 - 3 - MGT 307 Personnel Management¹
 - 3 - MGT 402 Operations Planning and Control¹
 - 3 - MGT 414 Statistical Analysis¹
 - 3 - MGT 418 Management Information Systems¹
 - 2 - Elective
-
- 17

Second Semester

- 3 - MGT 400 Mgt. of Organizational Behavior¹
 - 3 - MGT 404 Adv. Statistical Quality Control¹
 - 3 - MGT 408 Design of Production Systems¹
 - 3 - MGT 415 Business Strategy¹
 - 3 - MGT 423 International Business Mgt.¹
 - 2 - Elective
-
- 17

132 Total Semester Hours

¹Grade of C or better in this course is required for graduation.

²Select from Option List in Pre-Business curriculum.

³See General Education Requirements.

Note: At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MGT, and MKT must be taken at Clemson University.

MANAGEMENT

Bachelor of Science

The Bachelor of Science degree in Management prepares students for careers as professional managers in corporations, governmental organizations, and small businesses. In addition, the program provides a foundation for graduates who wish to pursue advanced degrees in business and public administration, law, and the social sciences.

The curriculum gives students a broad exposure to the functional areas of business and allows each to select an emphasis area in a subject that is germane to individual career interests. The Management curriculum provides an examination of the social, legal, political, and economic environments in which organizations must operate; an understanding of the functional areas of business and their interrelationships; and a knowledge of behavioral science, applied statistics, and mathematics as they relate to organizational problem solving. The program is accredited by AACSB International.

Sophomore Year

First Semester

- 3 - EX ST 301 Introductory Statistics or
 - 3 - MTHSC 301 Stat. Theory and Methods I or
 - 3 - MTHSC 309 Intro. Business Statistics
 - 3 - MGT 301 Principles of Management¹
 - 9 - Option List²
 - 1 - Elective
-
- 16

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 3 - MGT 218 Mgt. Personal Computer Appl.
 - 9 - Option List²
 - 1 - Elective
-
- 16

Junior Year

First Semester

- 3 - ACCT 202 Managerial Accounting Concepts
 - 3 - LAW 322 Legal Environment of Business
 - 3 - MGT 310 Intermediate Business Statistics¹
 - 3 - MKT 301 Principles of Marketing
 - 3 - Writing Intensive Requirement³
 - 2 - Elective
-
- 17

Second Semester

- 3 - ACCT 307 Managerial Accounting
 - 3 - FIN 306 Corporation Finance
 - 3 - MGT 307 Personnel Management¹
 - 3 - MGT 312 Decision Models for Management¹
 - 3 - Economics Requirement⁴
 - 2 - Elective
-
- 17

Senior Year

First Semester

- 3 - MGT 390 Operations Management¹
 - 3 - MGT 400 Mgt. of Organizational Behavior¹
 - 3 - MGT 418 Management Information Systems¹
 - 6 - Management Requirement^{1,5}
 - 2 - Elective
-
- 17

Second Semester

- 3 - MGT 415 Business Strategy¹
 - 3 - MGT 423 International Business Management¹
 - 6 - Management Requirement^{1,5}
 - 3 - Operations Management Requirement^{1,6}
 - 2 - Elective
-
- 17

132 Total Semester Hours

¹Grade of C or better in this course is required for graduation.

²Select from Option List in Pre-Business curriculum.

³See General Education Requirements.

⁴ECON 301, 308, 309, or 314.

⁵Twelve semester hours beyond required courses selected from 300- and 400-level MGT courses. In lieu of the Management Requirement, students may select a minor approved by the advisor and Management Department Chair or complete 12 hours from one of the following tracks.

Entrepreneurship—E LE (MKT) 314, E LE (ECON) 315, plus two courses from E LE 301, E LE (ECON) 321, E LE (PO SC, PSYCH, SOC) 356, E LE 401.

Human Resource Management (See advisor before selecting courses).—ECON 301, 308, MGT 416, 425, 431, 435, PSYCH 364, 368, 435.

International Management—ECON 310, FIN 411, LAW 420, plus one course from L&IT 401, MGT 424, (1 E) 444 (three hours), MKT 427.

Management Information Systems—CP SC 462, MGT 430, 452, 454, 455, 456.

Transportation and Logistics—MGT 305, 317, 424, plus one course from MGT 426, 427, 430, 490.

⁶Select from MGT 402, 404, 408, 411, 427.

Note: At least 50 percent of the total credits taken in ACCT, ECON, FIN, LAW, MGT, and MKT must be taken at Clemson University.

MARKETING

Bachelor of Science

The Bachelor of Science degree program in Marketing develops an understanding of various aspects of marketing. The curriculum prepares students for professional marketing careers in industry, government, or the non-profit sector. Graduates are also well prepared for entrance into the Master of Business Administration, law, or other graduate programs. For students who want a general perspective of marketing, the curriculum provides a broad range of subjects with the flexibility to tailor courses by choosing areas that will enhance career preparation in various areas of marketing. Subjects include promotional strategy, professional selling, sales management, public and nonprofit marketing, entrepreneurship, marketing research, product management, marketing management, and international marketing. Emphasis areas in services marketing, sport marketing, and technical marketing are available to students who seek to specialize. The Marketing curriculum, whether approached from a general or specialized perspective, provides the conceptual, quantitative, and analytical skills necessary to function in a dynamic business environment. The Marketing degree is accredited by AACSB International.

Students wishing to change majors into the Marketing program must have a cumulative grade-point ratio of 3.0 or better and must obtain permission of the department chair.

Sophomore Year

First Semester

- 3 - EX ST 301 Introductory Statistics or
 - 3 - MTHSC 301 Stat. Theory and Methods I or
 - 3 - MTHSC 309 Intro. Business Statistics
 - 3 - MGT 301 Principles of Management
 - 9 - Option List¹
 - 1 - Elective
-

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 3 - MGT 310 Intermediate Business Statistics
 - 9 - Option List¹
 - 1 - Elective
-

Junior Year

First Semester

- 3 - ACCT 202 Managerial Accounting Concepts
 - 3 - LAW 312 Commercial Law or
 - 3 - LAW 322 Legal Environment of Business
 - 3 - MKT 301 Principles of Marketing
 - 3 - Support Course Requirement²
 - 3 - Writing Intensive Requirement³
-

Second Semester

- 3 - FIN 306 Corporation Finance
 - 3 - MKT 302 Consumer Behavior
 - 3 - MKT 431 Marketing Research
 - 3 - Emphasis Area⁴
 - 3 - Support Course Requirement²
-

15

Senior Year

First Semester

- 3 - MGT 415 Business Strategy
 - 3 - MKT 427 International Marketing
 - 3 - Emphasis Area⁴
 - 3 - Support Course Requirement²
 - 4 - Elective
-

Second Semester

- 3 - MKT 450 Strategic Marketing Management
 - 3 - Emphasis Area⁴
 - 6 - Support Course Requirement²
 - 4 - Elective
-

126 Total Semester Hours

¹Select from Option List in Pre-Business curriculum.²Chosen jointly by the student and the advisor. These must support the emphasis area selected by the student. Certain minors may be used to satisfy the support courses requirement. See advisor for details.³See General Education Requirements.⁴Select one of the following emphasis areas:

General Marketing—MKT 420 or 423; 425, 426, 428, or 429; and any one additional MKT course.

Services Marketing—MKT 420 or 423; 425, 426, or 429; and 428.

Sport Marketing—MKT 321; 420 or 423; and 428.

Technical Marketing—MKT 420; 423, 424, 428, or 430; and 426.

Note: At least 50 percent of the total credit hours taken in ACCT, ECON, FIN, LAW, MGT, and MKT must be taken at Clemson University.

POLITICAL SCIENCE

The Department of Political Science offers two degree programs: a bachelor of arts and a bachelor of science, each requiring a total of 130 credit hours. Both prepare students for a wide range of graduate programs and career opportunities. The bachelor of arts program provides broad coverage of the political science discipline and emphasizes communication skills and language arts. The bachelor of science program is recommended for those with an aptitude for mathematics and/or an interest in political economy, public administration, public policy, or other fields requiring advanced quantitative skills. Both programs are appropriate for pre-law students and for students interested in foreign policy or international relations. Note that the bachelor of arts degree requires a minor, and the bachelor of science degree requires a field of concentration and, depending on the concentration, requires or allows a minor.

Bachelor of Arts

The requirements for a Bachelor of Arts in Political Science consist of PO SC 101, 102 or 104, 301, and at least 21 additional credit hours in political science at the 300–400 level, including at least one course from four of the following five fields:

- American Government—PO SC 403, 405, 416, 432, 442
- Comparative Politics—PO SC 371, 471, 472, 476, 477, 478
- International Relations—PO SC 361, 362, 363, 428
- Political Theory—PO SC 450, 453
- Public Policy and Public Administration—PO SC 302, 321, 421, 423, 424, 430

The student's elective hours in political science are chosen with the consent and advice of the departmental advisor to ensure an appropriate balance of breadth and specialization within the field of political science. In addition to the courses listed above, the department offers a wide range of specialized courses in each of the subfields of the political science discipline.

Note: No more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree; no more than three hours credit from these courses may be applied to the requirements of a Political Science major.

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
 - 3 - MTHSC 101 Introduction to Probability¹
 - 3 - PO SC 101 American National Government
 - 4 - Foreign Language Requirement²
 - 4 - Science Requirement³
-

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - MTHSC 102 Intro. to Mathematical Analysis¹
 - 3 - PO SC 102 Intro. to International Relations or
 - 3 - PO SC 104 Intro. to Comparative Politics
 - 4 - Foreign Language Requirement²
 - 4 - Science Requirement³
-

Sophomore Year

First Semester

- 3 - HIST 172 Western Civilization
 - 3 - PO SC 301 Foundations of Political Science
 - 3 - Computer Skills Requirement¹
 - 3 - Foreign Language Requirement²
 - 3 - Literature Requirement⁴
 - 3 - Oral Communication Requirement¹
-

Second Semester

- 3 - HIST 173 Western Civilization
 - 3 - Foreign Language Requirement²
 - 3 - Literature Requirement⁴
 - 6 - Major and Minor Areas⁵
 - 3 - Writing Intensive Requirement¹
-

Junior Year

First Semester

- 3 - ECON 211 Principles of Microeconomics
 - 3 - Advanced Humanities Requirement⁶
 - 6 - Major and Minor Areas⁵
 - 3 - Elective
-

Second Semester

- 3 - ECON 212 Principles of Macroeconomics
 - 3 - Advanced Humanities Requirement⁶
 - 6 - Major and Minor Areas⁵
 - 3 - Elective
-

15

Senior Year**First Semester**

- 3 - Advanced Humanities Requirement⁶
- 9 - Major and Minor Areas⁵
- 3 - Elective

15**Second Semester**

- 9 - Major and Minor Areas⁵
- 6 - Elective

15

130 Total Semester Hours

¹Students may pursue alternate sequences consistent with General Education Requirements. Examples include MTHSC 101 and 106 or 203; 102 and 207; 106 and 108, 207, or 301.

The equivalent of two years (through 202) of the same modern language is required.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴See list of approved minors on page 76.

⁵Advanced humanities are courses numbered 300 or higher (A A H 210, MUSIC 210, THEA 210 excepted). The humanities for this purpose include art and architectural history, communication studies (except 362 and 364), English (except 304, 312, 314, 316, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, theatre (except 377, 487, and 497), and women's studies, as well as courses entitled Humanities.

POLITICAL SCIENCE**Bachelor of Science****Freshman Year****First Semester**

- 3 - ENGL 101 Composition I
- 3 - MTHSC 102 Intro. to Mathematical Analysis¹
- 3 - PO SC 101 American National Government
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17**Second Semester**

- 3 - ENGL 102 Composition II
- 3 - MTHSC 207 Multivariable Calculus¹
- 3 - PO SC 102 Intro. to International Relations or
3 - PO SC 104 Intro. to Comparative Politics
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17**Sophomore Year****First Semester**

- 3 - ECON 211 Principles of Microeconomics
- 3 - MTHSC 301 Statistical Theory and Methods I
- 3 - PO SC 301 Foundations of Political Science
- 3 - American Politics Requirement¹
- 3 - Foreign Language Requirement² or
3 - PHIL 102 Introduction to Logic
- 3 - Humanities Requirement E.1³

18**Second Semester**

- 3 - CP SC 120 Intro. to Information Technology
- 3 - ECON 212 Principles of Macroeconomics
- 3 - Foreign Language Requirement² or
3 - Elective
- 3 - International Politics Requirement⁵
- 3 - Oral Communication Requirement¹
- 3 - Writing Intensive Requirement¹

18

¹MTHSC 106 and 108 may be substituted.

²The equivalent of one year (through 102) of the same modern foreign language is required. Students pursuing an international concentration must complete the equivalent of two years (through 202) of the same modern foreign language and may substitute a 200-level language class for PHIL 102. Students pursuing non-international concentrations may also substitute a 200-level language class for PHIL 102.

³See General Education Requirements.

⁴Select from PO SC 321, 343, 381, 389 (by permission only), 403, 405, 407, 409, 416, 421, 423, 424, 427, 432, 433, 442, 454, 489 (by permission only).

⁵Select from PO SC 361, 362, 363, 367, 371, 372, 375, 389 (by permission only), 410, 428, 429, 457, 471, 472, 476, 477, 478, 489 (by permission only).

**AMERICAN POLITICS
CONCENTRATION****Junior Year****First Semester**

- 3 - PO SC 341 Quantitative Methods in Pol. Sci.
- 3 - American Politics Requirement¹
- 3 - Minor²
- 6 - Elective

15**Second Semester**

- 3 - American Politics Requirement¹
- 3 - Minor²
- 9 - Elective

15**Senior Year****First Semester**

- 3 - American Politics Requirement¹
- 3 - Minor²
- 6 - Elective

15**Second Semester**

- 3 - American Politics Requirement¹
- 6 - Minor²
- 6 - Elective

15

130 Total Semester Hours

¹Select from PO SC 321, 343, 381, 389 (by permission only), 403, 405, 407, 409, 416, 421, 423, 424, 427, 432, 433, 442, 454, 489 (by permission only)

²See page 76 for approved minors.

**INTERNATIONAL POLITICS
CONCENTRATION****Junior Year****First Semester**

- 3 - PO SC 341 Quantitative Methods in Pol. Sci.
- 3 - International Politics Requirement¹
- 3 - Minor²
- 6 - Elective

15**Second Semester**

- 3 - International Politics Requirement¹
- 3 - Minor²
- 9 - Elective

15**Senior Year****First Semester**

- 3 - International Politics Requirement¹
- 6 - Minor²
- 6 - Elective

15**Second Semester**

- 3 - International Politics Requirement¹
- 3 - Minor²
- 6 - Elective

15

130 Total Semester Hours

¹Select from PO SC 361, 362, 363, 367, 371, 372, 375, 389 (by permission only), 410, 428, 429, 457, 471, 472, 476, 477, 478, 489 (by permission only).

²See page 76 for approved minors.

**POLITICAL ECONOMY
CONCENTRATION****Junior Year****First Semester**

- 3 - ECON 314 Intermediate Microeconomics
- 4 - ECON 405 Introduction to Econometrics
- 3 - Advanced Political Science Requirement¹
- 5 - Elective

15**Second Semester**

- 3 - ECON 315 Intermediate Macroeconomics
- 3 - Advanced Political Science Requirement¹
- 9 - Elective

15**Senior Year****First Semester**

- 6 - Advanced Political Science Requirement¹
- 3 - Economics Requirement²
- 6 - Elective

15**Second Semester**

- 3 - Advanced Economics Requirement¹
- 3 - Advanced Political Science Requirement¹
- 9 - Elective

15

130 Total Semester Hours

¹See advisor.²ECON 404, 413, 419, or 420.³Any ECON course numbered 300 or higher.

PUBLIC ADMINISTRATION CONCENTRATION

Junior Year

First Semester

- 3 - PO SC 321 Public Administration
- 3 - PO SC 341 Quantitative Methods in Pol. Sci.
- 3 - Political Science Requirement¹
- 6 - Elective

15

Second Semester

- 3 - Advanced Political Science Requirement²
- 6 - Public Administration Requirement²
- 6 - Elective

15

Senior Year

First Semester

- 3 - PO SC 430 Public Policy Evaluation
- 6 - Public Administration Requirement²
- 6 - Elective

15

Second Semester

- 6 - Public Administration Requirement²
- 9 - Elective

15

130 Total Semester Hours

¹PO SC 302, 363, 424, 428, or 429.²See advisor.

PUBLIC POLICY CONCENTRATION

Junior Year

First Semester

- 3 - PO SC 341 Quantitative Methods in Pol. Sci.
- 3 - PO SC 421 Public Policy
- 3 - Advanced Political Science Requirement¹
- 6 - Elective

15

Second Semester

- 3 - Advanced Political Science Requirement¹
- 6 - Public Policy Requirement¹
- 6 - Elective

15

Senior Year

First Semester

- 3 - PO SC 430 Public Policy Evaluation
- 6 - Public Policy Requirement¹
- 6 - Elective

15

Second Semester

- 6 - Public Policy Requirement¹
- 9 - Elective

15

130 Total Semester Hours

¹See advisor.

PSYCHOLOGY

Psychology is the study of human and animal behavior and the biological, psychological, and social processes related to that behavior. The Bachelor's degree in Psychology is designed to prepare students for a variety of professional careers related to human resources, personnel, counseling, and other people-oriented positions in human services, business, and industry. Additionally, the Bachelor's degree provides excellent preparation for graduate training in such areas as clinical, counseling, industrial, experimental, cognitive, social, biological, health, developmental, and school psychology. The program also provides excellent preparation for students who intend to pursue professional training in medicine, physical or occupational therapy, dentistry, pharmacy, veterinary science, or law. Further information is available on the Web at www.clemson.edu/psych/.

Bachelor of Arts

The Bachelor of Arts program requires PSYCH 201, 202, 309, 310, 492, and 19 additional credits in psychology which must include the following:

Two courses from the **Biological and Cognitive** menu: PSYCH 324, 333, 422.

One course from each of the following menus:

Applied—PSYCH 355, 364, 368, 375, 435, 480, 483, 488

Individuals and Groups—PSYCH 340, 352, 370
Laboratory—PSYCH 325, 334, 423, 471, H490, 493, 495, 496, 497

At least six credits must be from 400-level psychology courses, with at least three of those credits from psychology courses numbered between 400 and 489. BIOSC 470 may be taken in lieu of one 300- or 400-level elective psychology course. Students should consult their advisors for other degree requirements and course recommendations.

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - PSYCH 201 Introduction to Psychology
- 1 - PSYCH 202 Introductory Psychology Lab.
- 4 - Foreign Language Requirement¹
- 3 - Mathematical Sciences Requirement²
- 3 - Social Science Requirement³

17

Second Semester

- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 102 Composition II
- 3 - Cultural Awareness Requirement⁴
- 4 - Foreign Language Requirement¹
- 3 - Mathematical Sciences Requirement²

16

Sophomore Year

First Semester

- 4 - PSYCH 309 Intro. Experimental Psychology
- 3 - Foreign Language Requirement¹
- 3 - Humanities Requirement E.1¹
- 4 - Science Requirement²
- 3 - Elective

17

Second Semester

- 4 - PSYCH 310 Adv. Experimental Psychology
- 3 - Foreign Language Requirement¹
- 3 - Humanities Requirement E.2¹
- 4 - Science Requirement²
- 3 - Elective

17

Junior Year

First Semester

- 3 - Cultural Awareness Requirement⁴
- 4 - Major Area
- 3 - Minor Area
- 3 - Writing Intensive Requirement⁵
- 2 - Elective

15

Second Semester

- 3 - Major Area
- 3 - Minor Area¹
- 3 - Oral Communication Requirement⁴
- 6 - Elective

15

Senior Year

First Semester

- 1 - PSYCH 492 Senior Laboratory in Psychology
- 6 - Major Area
- 6 - Minor Area¹
- 3 - Elective

16

Second Semester

- 6 - Major Area
- 3 - Minor Area¹
- 6 - Elective

15

128 Total Semester Hours

¹The equivalent of two years (through 202), of the same modern language is required. Courses used to satisfy the Foreign Language Requirement may not also be used to satisfy the Humanities Requirement E.2.

²See General Education Requirements. Note: Courses used to satisfy the Humanities Requirement E.2 may not also be used to satisfy the Foreign Language Requirement.

³See General Education Requirements. Social science other than psychology.

⁴See department approved list. Courses used to fulfill the Humanities Requirement, Social Science Requirement, or Major Area may not be used to meet this requirement.

⁵Any minor listed on page 76.

PSYCHOLOGY

Bachelor of Science

The requirements for the Bachelor of Science program in Psychology consist of PSYCH 201, 202, 309, 310, 492, and 19 additional credits of psychology courses which must include the following:

Two courses from the **Biological and Cognitive** menu: PSYCH 324, 333, 422.

One course from each of the following menus:

Applied—PSYCH 355, 364, 368, 375, 435, 480, 483, 488

Foundations of Science—G W 402, P111L 326, 327, 425, PSYCH 415

Individuals and Groups—PSYCH 340, 352, 370
Laboratory—PSYCH 325, 334, 423, 471, H490, 493, 495, 496, 497

At least six credits must be from 400-level psychology courses, with at least three of those credits from psychology courses numbered between 400 and 489. BIOSC 470 may be taken in lieu of one 300- or 400-level elective psychology course. Students should consult their advisors for other degree requirements and course recommendations.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I¹
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 101 Composition I
- 3 - PSYCH 201 Introduction to Psychology
- 1 - PSYCH 202 Introductory Psychology Lab.
- 3 - Mathematical Sciences Requirement²

17

Second Semester

- 4 - BIOL 104 General Biology II¹
- 3 - ENGL 102 Composition II
- 3 - PHIL 102 Introduction to Logic
- 3 - Cultural Awareness Requirement³
- 3 - Mathematical Sciences Requirement²

16

Sophomore Year

First Semester

- 4 - PSYCH 309 Intro. Experimental Psychology
- 3 - Cultural Awareness Requirement³
- 3 - Humanities Requirement E.1⁴
- 3 - Physical or Natural Science Requirement⁵
- 3 - Elective

16

Second Semester

- 4 - PSYCH 310 Adv. Experimental Psychology
- 3 - Mathematical Sciences Requirement²
- 3 - Physical or Natural Science Requirement⁵
- 3 - Social Science Requirement⁶
- 3 - Elective

16

Junior Year

First Semester

- 3 - ENGL 304 Business Writing or
 - 3 - ENGL 312 Adv. Expository Writing or
 - 3 - ENGL 314 Technical Writing
- 4 - Major Area
- 3 - Minor Area⁷
- 3 - Physical or Natural Science Requirement⁵
- 3 - Elective

16

Second Semester

- 3 - COMM 150 Intro. to Speech Comm. or
 - 3 - COMM 250 Public Speaking or
 - 3 - COMM 251 Business and Prof. Speaking
- 3 - Major Area
- 3 - Minor Area⁷
- 3 - Social Science Requirement⁶
- 4 - Elective

16

Senior Year

First Semester

- 1 - PSYCH 492 Senior Laboratory in Psychology
- 6 - Major Area
- 6 - Minor Area⁷
- 3 - Elective

16

Second Semester

- 6 - Major Area
- 3 - Minor Area⁷
- 6 - Elective

15

128 Total Semester Hours

¹Biology 110 and 111 may be substituted. In this case, the extra two credit hours will be counted as electives.

²Nine hours are required. See General Education requirements.

³See department approved listing. Courses used to fulfill the Humanities Requirement, Social Science Requirement, or Major Area may not be used to meet this requirement.

⁴See General Education Requirements.

⁵Six of the nine hours must come from a two-semester sequence in a physical or natural science other than biology.

⁶See General Education Requirements. Social science other than psychology.

⁷Any minor listed on page 76.

SOCIOLOGY

The Sociology major offers two degree programs: a bachelor of arts and a bachelor of science. The Bachelor's degree in Sociology prepares students for a variety of professional careers related to human resources, management, public relations, social services, criminal justice, health services, social research, and other people-oriented positions in the public and private sector. In addition, the Bachelor's degree provides excellent preparation for graduate training in sociology, social services, law, and business. Both degrees require a total of 128 semesters hours as identified below. Courses used to fulfill Humanities, Mathematical Sciences, and Science Requirements may be used to fulfill minor requirements.

Emphasis Areas in Sociology

Community Studies—SOC 331, (R S) 459, (R S) 495; and nine credits from all courses offered in anthropology or sociology not already taken to fulfill requirements.

Criminal Justice—SOC 390, 393; nine credits selected from SOC 391, 392, 396, 397, 491, 493, 494, (R S) 495; and three credits from all courses offered in anthropology or sociology not already taken to fulfill requirements.

General Sociology—12 credit hours selected from ANTH 201, SOC 202, 311, 330, 331, 350, 351, 380, 391, 414, 430, 432, 440, (R S) 471, 480, 481, (R S) 495; and six additional credits from all courses offered in anthropology or sociology not already taken to fulfill requirements.

Social Services—SOC 380, 414, (R S) 495; and nine credits from all courses offered in anthropology or sociology not already taken to fulfill requirements.

At least 12 of the total credits must be from 400-level sociology, rural sociology, and/or anthropology courses; no more than nine credit hours may be taken in courses at the 100 or 200 level, except

with approval of the department chair. Additional electives are added to meet the minimum of 128 hours required for graduation.

Substance Abuse Certificate Program

The Substance Abuse Certificate Program is an interdisciplinary program drawn from courses in sociology, education, health, and psychology. Students study the causes, consequences, prevention, and treatment of substance abuse. They also study delivery systems and policy issues associated with legal and illicit substances. Through field placement, students come fact-to-face with the problem and gain practical experience to prepare them to enter the field of practicing specialists. The program prepares students for state credentialing as substance abuse specialists. The credential requires knowledge in theory and treatment of substance abuse problems.

Completion of the Substance Abuse Certificate Program requires ED C 234, HLTH 301, PSYCH 375, SOC 380, 396, 397, (R S) 495.

Bachelor of Arts

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability¹
- 3 - SOC 201 Introduction to Sociology
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - MTHSC 203 Elementary Statistical Inference¹
- 3 - Foreign Language Requirement²
- 4 - Science Requirement³
- 3 - Elective

17

Sophomore Year

First Semester

- 3 - CP SC 120 Intro. to Information Technology
- 3 - Foreign Language Requirement²
- 3 - Humanities Requirement E.1³
- 3 - Oral Communication Requirement⁴
- 3 - Elective

15

Second Semester

- 3 - Foreign Language Requirement²
- 3 - Humanities Requirement E.2³
- 6 - Minor⁴
- 3 - Elective

15

Junior Year

First Semester

- 4 - SOC (R S) 303 Methods of Social Research I
- 3 - Advanced Humanities Requirement⁵
- 3 - Emphasis Area⁶
- 3 - Global Awareness Requirement⁷
- 3 - Writing Intensive Requirement¹

16

Second Semester

- 3 - Advanced Humanities Requirement¹
 - 6 - Emphasis Area^a
 - 6 - Minor^d
 - 3 - Elective
-
- 18

Senior Year**First Semester**

- 3 - Advanced Humanities Requirement¹
 - 6 - Emphasis Area^a
 - 3 - Stratification Requirement^b
 - 3 - Elective
-
- 15

Second Semester

- 3 - SOC 404 Sociological Theory
 - 3 - Advanced Humanities Requirement¹
 - 3 - Emphasis Area^a
 - 3 - Minor^d
 - 3 - Elective
-
- 15

128 Total Semester Hours

¹MTHSC 106 and 301 may be substituted.^aThe equivalent of two years (through 2021) in the same foreign language is required.^bSee General Education Requirements.^cSee page 76 for approved minors.^dHumanities courses numbered 300 or higher (A A H 210, MUSC 210, THEA 210 excepted). The humanities for this purpose include art and architectural history, communication studies (except 368 and 364), English (except 304, 312, 314, 316, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, theatre (except 377, 487, 497), and women's studies, as well as courses entitled Humanities.^eSee advisor.^fANTH 301 or SOC 433.^gSOC 460 or 461.**SOCIOLOGY****Bachelor of Science****Freshman Year****First Semester**

- 3 - ENGL 101 Composition I
 - 3 - MTHSC 101 Introduction to Probability¹
 - 3 - SOC 201 Introduction to Sociology
 - 3 - Humanities Requirement E.2²
 - 4 - Science Requirement³
-
- 16

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - MTHSC 203 Elementary Statistical Inference¹
 - 3 - Oral Communication Requirement²
 - 4 - Science Requirement³
 - 3 - Elective
-
- 16

Sophomore Year**First Semester**

- 3 - CP SC 120 Intro. to Information Technology
 - 3 - Humanities Requirement E.1²
 - 6 - Mathematics or Science Requirement¹
 - 3 - Elective
-
- 15

Second Semester

- 4 - Mathematics or Science Requirement¹
 - 6 - Minor^d
 - 5 - Elective
-
- 15

Junior Year**First Semester**

- 3 - ENGL 314 Technical Writing
 - 4 - SOC (R S) 303 Methods of Social Research I
 - 3 - Emphasis Area¹
 - 3 - Global Awareness Requirement^{2a}
 - 3 - Philosophy Requirement²
-
- 16

Second Semester

- 3 - Advanced Humanities Requirement^{1a}
 - 6 - Emphasis Area¹
 - 6 - Minor^d
 - 3 - Elective
-
- 18

Senior Year**First Semester**

- 3 - ANTH 351 Physical Anthropology⁹
 - 3 - Emphasis Area¹
 - 5 - Mathematics or Science Requirement¹
 - 3 - Stratification Requirement¹⁰
 - 3 - Elective
-
- 17

Second Semester

- 3 - SOC 404 Sociological Theory
 - 6 - Emphasis Area¹
 - 3 - Minor^d
 - 3 - Elective
-
- 15

128 Total Semester Hours

¹MTHSC 106 and 301 may be substituted.²See General Education Requirements.³See advisor. At least six of the 15 hours must be at the 300 level or above.⁴See page 76 for approved minors.⁵See advisor.⁶ANTH 301 or SOC 433.⁷PHIL 323, 325, 326, 327, 355, or 360.⁸Humanities courses numbered 300 or higher (A A H 210, MUSC 210, THEA 210 excepted). The humanities for this purpose include art and architectural history, communication studies (except 362 and 364), English (except 304, 312, 314, 316, 333, 334, 335, 485, 490, 495), languages, music, philosophy, religion, theatre (except 377, 487, 497), and women's studies, as well as courses entitled Humanities.⁹May not be used to fill the 14 credits for the major.¹⁰SOC 460 or 461.

MINORS

Following are minors acceptable for students in the College of Business and Behavioral Science. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting	Health Science
Adult/Extension Education	History
Aerospace Studies	Horse Production
African American Studies	Horticulture
Agricultural Business Management	Human Resource Management— <i>not open to Industrial Management or Management majors</i>
Agricultural Mechanization and Business	International Politics— <i>not open to Political Science majors</i>
Anthropology	Legal Studies
Athletic Leadership	Management— <i>not open to Industrial Management majors</i>
Beef Cattle Production	Mathematical Sciences
Biochemistry	Microbiology
Bioengineering	Military Leadership
Biological Sciences	Modern Languages
Business Administration— <i>not open to Accounting, BS Economics, Financial Management, Industrial Management, Management, or Marketing majors</i>	Music
Chemistry	Natural Resource Economics
Cluster	Operations Management— <i>not open to Industrial Management or Management majors</i>
Communication Studies	Packaging Science
Communications	Parks, Recreation, and Tourism Management
Computer Science	Philosophy
Crop and Soil Environmental Science	Physics
Early Intervention— <i>open to Psychology and Sociology majors only</i>	Plant Pathology
East Asian Studies	Political Science
Economics	Poultry Science
Education— <i>not open to Graphic Communications majors</i>	Psychology
English	Public Policy— <i>not open to Political Science majors</i>
Entomology	Religion
Entrepreneurship— <i>not open to Accounting, BS Economics, Financial Management, Industrial Management, Management, or Marketing majors</i>	Science and Technology in Society
Environmental Engineering	Screenwriting
Environmental Science and Policy	Sociology
Film Studies	Spanish-American Area Studies
Financial Management	Textiles
Fine Arts	Theatre
Food Science	Turfgrass
Forest Products	Urban Forestry
Forest Resource Management	Wildlife and Fisheries Biology
Geography	Women's Studies
Geology	Writing
Great Works	

See pages 35-38 for details.

COLLEGE OF ENGINEERING AND SCIENCE

The College of Engineering and Science offers a broad range of rigorous and stimulating baccalaureate programs which provide unexcelled educational opportunities. The innovative combination of engineering and science disciplines which comprises the College facilitates study and research in fields transcending the traditional disciplines. Students enjoy close interaction with a distinguished faculty committed to excellence in undergraduate education as well as in research. The College Web site at www.ces.clemson.edu has additional information on the College and its programs.

Minors

Engineering and science students can complement their majors by selecting minor concentrations of study. Available minors include Bioengineering, Environmental Engineering, International Engineering and Science, one in each of the science majors, and in Textiles. (See page 93.)

International Programs

The world economy has become very tightly integrated, making it highly important that engineering and science students prepare themselves for this global environment. The College offers a minor in International Engineering and Science coupled with several programs that provide opportunities for students to gain international experience. These include study abroad at many locations around the world and EPIC (an international co-op program). In addition, engineering and science students are encouraged to pursue study of a foreign language. Information on international programs is available in the Undergraduate Studies Office (107 Riggs Hall) and on the Web at www.ces.clemson.edu.

ENGINEERING PROGRAMS

The professional Bachelor of Science engineering degrees in Biosystems Engineering, Ceramic and Materials Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Industrial Engineering, and Mechanical Engineering are each accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology. The Biosystems Engineering program is administered jointly with the College of Agriculture, Forestry, and Life Sciences.

All engineering programs have the common goal of producing engineering graduates who are able to

- apply knowledge of math, science, and engineering;
- formulate and solve engineering problems;
- design and conduct experiments and analyze data;
- design systems or components to meet needs;
- function on multidisciplinary teams;
- communicate effectively;
- conduct themselves professionally and ethically;
- appreciate engineering's global/societal context;
- understand contemporary engineering issues;
- apply modern engineering methods and tools;
- appreciate the need for life-long learning.

Each engineering program has additional objectives specific to the discipline. All prepare students for a wide range of career opportunities and provide sound preparation for graduate study. Each curriculum provides opportunities for students to pursue individual areas of interest.

Admission Requirements

The University admission requirements are given under the section entitled *Admission*. Engineering applicants are strongly advised to include the following in their high school program:

Mathematics—Four units, including geometry, trigonometry, and introductory calculus.

Laboratory Science—At least three units, including both chemistry and physics.

Computing—At least one unit, including introduction to a programming language. Applicants should have good keyboarding skills.

General Engineering Program

The General Engineering Program provides students with an opportunity to explore various engineering fields while gaining a sound academic preparation for engineering study. All engineering students must complete the freshman engineering curriculum before being admitted into an engineering baccalaureate degree program. All new engineering students (including transfer students) are admitted into General Engineering. Students with no programming experience who plan to enter Computer Engineering should consult an advisor about taking CP SC 101 or 111 as an elective in the first semester. Additional information about General Engineering can be found on the Web at www.ces.clemson.edu/ge.

Freshman Curriculum

First Semester

- 4 - CH 101 General Chemistry
- 1 - CES 101 Intro. to Engineering and Science or
 - 1 - ENGR 101 Introduction to Engineering
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Humanities/Social Science Requirement

15

Second Semester

- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 3 - ENGR 120 Engineering Problem Solving and Design
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I

17

Admission into Engineering Degree Programs

To transfer into an engineering degree program, a student must have a 2.0 minimum cumulative grade-point ratio in courses taken at Clemson and have completed the General Engineering freshman curriculum with a C or better in each course in the freshman curriculum except the humanities/social science requirement.

Students should initiate a change-of-major request prior to the registration period during the semester in which they expect to complete the freshman curriculum. Students who fail to meet the requirements

for admission into a degree program may remain in General Engineering until those requirements are met; however, General Engineering (major code 402) majors will not be permitted to take any 300- or 400-level engineering course. Individual departments may allow General Engineering majors to enroll in selected 200-level engineering courses (policy varies by department). Students transferring into an engineering degree program will follow the curriculum in effect at the time of transfer.

Humanities and Social Sciences for Engineering Curricula

Engineers have an obligation to practice their profession in a socially responsible manner. The education of engineers must prepare them for these responsibilities and make them aware of the constraints imposed by societal factors. Thus, an important component of the engineering curricula is a program of study of the humanities and social sciences in which students are required to achieve depth of knowledge in one or two areas rather than simply taking a collection of introductory courses.

This program of study must include a minimum of 15 credits selected so as to satisfy the University's General Education policy on humanities and social sciences as well as meeting engineering objectives. Thus, the courses chosen must satisfy all of the following criteria:

1. Six credits of General Education humanities courses, which must include
 - a) Three credits of sophomore literature (200 level) or foreign language literature (300 level or higher) selected from General Education Section E.1*.
 - b) Three credits selected from courses in General Education Section E.2*.
2. Six credits of social science courses selected from General Education Section F*.
3. At least three additional credits selected from the List of Approved Humanities and Social Science Courses for Engineering Curricula. (This list includes General Education courses, plus additional choices.)
4. To provide depth, the courses chosen must contain either
 - a) Nine credits in a single subject area or
 - b) Six credits in each of two different subjects.

Individual engineering curricula may have more specific requirements (e.g., an economics course or a second literature course may be required), or may require more than 15 hours of humanities/social science courses. Students should consult their academic advisors for information.

*All courses must be selected from the List of Approved Humanities and Social Science Courses for Engineering Curricula. Specifically, some courses approved in the General Education policy may not be accepted by the College of Engineering and Science because of Accreditation Board for Engineering and Technology (ABET) restrictions.

Electives for Engineering Curricula

Advisors must approve any course taken for elective credit in the Engineering curricula. Courses excluded for elective credit include PHYS 200, 207, 208.

Registration Requirements

A cumulative grade-point ratio of 2.0 or higher is required for registration in engineering courses numbered 300 or higher. Priority for registration in engineering courses is given to those majors for whom the course is a degree requirement. Exceptions to this requirement may be granted by the department offering the course.

Graduation Requirements

In addition to other institutional requirements, candidates for a baccalaureate degree in Engineering are required to have a 2.0 or higher cumulative grade-point ratio in all engineering courses taken at Clemson. All courses with "Engineering" in the course designator (e.g., ENGR 120, ME 453, etc.) are used in this calculation.

The baccalaureate programs in Engineering are designed to be completed in four years (eight regular semesters). Taking a reduced load or participating in cooperative education will extend this time. On average, Clemson engineering students take about four and one-half years to complete the requirements for graduation.

BIOSYSTEMS ENGINEERING

Bachelor of Science

The principal objective of the biosystems engineering program is to educate and prepare students for a wide range of engineering endeavors involving biological entities. Three main areas are supported: engineering for management of natural resources and the environment; engineering for environmentally-sound and sustainable production systems for food, fiber, and bioresources; and engineering for production of value-added products from bioprocessing technologies.

Biosystems engineers work at the interface between engineering and life sciences and must be knowledgeable in both disciplines. In addition to the common objectives of all engineering programs listed on page 77, Biosystems Engineering students should achieve familiarity with all biosystems concentrations, experience an interdisciplinary education, and develop a career goal of professional recognition and licensure. Students develop specialization in one of three concentrations. Specific objectives per concentration aim to equip students to

- apply engineering and agricultural sciences to the production of food, feed, fiber, and related consumer products (Agricultural Engineering Concentration).
- apply engineering and biological sciences to problem solving for biological systems and production of value added bioproducts in a wide range of industries (Applied Biotechnology Concentration).
- apply engineering and agricultural and environmental sciences to assess and control the impact of human activities on the biosphere (Natural Resources and Environment Concentration).

Additional information is available from the departmental offices and can be found on the Web at www.clemson.edu/agbioeng.

AGRICULTURAL ENGINEERING CONCENTRATION

Sophomore Year

First Semester

- 2 - BE 221 Surveying for Soil and Water Res.
- 2 - EG 209 Intro. to Engr./Comp. Graphics
- 3 - EM 201 Engineering Mechanics: Statics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 3 - Elective

17

Second Semester

- 2 - BE 214 Fabrication and Manufacturing Meth.
- 3 - EM 202 Engineering Mechanics: Dynamics
- 3 - ENGL 314 Technical Writing
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - Humanities/Social Science Requirement¹
- 3 - Literature Requirement¹

18

Junior Year

First Semester

- 2 - BE 357 Machine Unit Operations
- 3 - COMM 250 Public Speaking
- 2 - EC E 307 Basic Electrical Engineering
- 3 - EM 304 Mechanics of Materials
- 3 - ME 310 Thermodynamics and Heat Transfer
- 3 - Plant/Animal Science Requirement¹

16

Second Semester

- 3 - BE 322 Small Watershed Hydrology and Sedimentology
- 2 - BE 333 Environmental Modification
- 2 - BE 350 Microcomputer Controls in Biosys.
- 3 - BE 362 Energy Conversion for Biosystems
- 4 - CE 341 Introduction to Fluid Mechanics
- 4 - CSENV 202 Soils

18

Senior Year

First Semester

- 3 - BE 416 Biosystems Engr. Capstone Design
- 2 - BE 431 Structural Design for Biosystems
- 3 - BE 450 Instrumentation for Biosys. Engineers
- 3 - ECON 211 Principles of Microeconomics or
- 3 - Humanities/Social Science Requirement¹
- 4 - Elective

18

Second Semester

- 2 - BE 421 Engr. Systems for Soil Water Mgt.
- 2 - BE 442 Properties and Proc. of Biol. Prod.
- 2 - BE 471 Engineering Research and Mgt.
- 3 - ECON 211 Principles of Microeconomics or
- 3 - ECON 200 Economic Concepts⁵
- 3 - Technical Requirement²
- 4 - Elective

16

135 Total Semester Hours

¹See Policy on Humanities and Social Sciences for Engineering Curricula.

²See advisor.

³ECON 211 is preferred.

APPLIED BIOTECHNOLOGY CONCENTRATION

Sophomore Year

First Semester

- 2 - EG 209 Intro. to Engr./Comp. Graphics
- 3 - EM 201 Engineering Mechanics: Statics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 4 - Organic Chemistry Requirement¹

16

Second Semester

- 2 - BE 214 Fabrication and Manufacturing Meth.
- 3 - EM 202 Engineering Mechanics: Dynamics
- 3 - ENGL 314 Technical Writing
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 4 - Biochemistry Requirement²

16

Junior Year

First Semester

- 3 - BE 430 Problem Solving Methods and Models in Biosystems Engineering
- 2 - EC E 307 Basic Electrical Engineering
- 3 - EM 304 Mechanics of Materials
- 3 - ME 310 Thermodynamics and Heat Transfer
- 4 - MICRO 305 General Microbiology
- 3 - Technical Requirement¹

18

Second Semester

- 2 - BE 333 Environmental Modification
- 2 - BE 350 Microcomputer Controls in Biosys.
- 3 - BE 362 Energy Conversion for Biosystems
- 3 - BE (CHE) 428 Biochemical Engineering
- 4 - CE 341 Introduction to Fluid Mechanics
- 3 - COMM 250 Public Speaking

17

Senior Year

First Semester

- 3 - BE 416 Biosystems Engr. Capstone Design
- 3 - BE 435 Appl. in Biotechnology Engineering
- 3 - BE 450 Instrumentation for Biosys. Engineers
- 3 - Literature Requirement⁴
- 6 - Elective

18

Second Semester

- 2 - BE 442 Properties and Proc. of Biol. Prod.
- 2 - BE 471 Engineering Research and Mgt.
- 3 - ECON 211 Principles of Microeconomics or
- 3 - ECON 200 Economic Concepts⁵
- 6 - Humanities/Social Science Requirement⁴
- 5 - Elective

18

135 Total Semester Hours

¹CH 201, 223/227, or 223/229 (with the extra two credit hours credited to electives). Students interested in medical careers should consider CH 223/229.

²BIOCH 301/302 or 305/306.

³Select from courses in math, statistics, or computational science or minor course.

⁴See Policy on Humanities and Social Sciences for Engineering Curricula.

⁵ECON 211 is preferred.

NATURAL RESOURCES AND ENVIRONMENT CONCENTRATION

Sophomore Year

First Semester

- 2 - B E 221 Surveying for Soil and Water Res.
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 2 - Elective

16

Second Semester

- 2 - B E 214 Fabrication and Manufacturing Meth.
- 3 - E M 202 Engineering Mechanics: Dynamics
- 3 - ENGL 314 Technical Writing
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - Humanities/Social Science Requirement¹
- 3 - Literature Requirement¹

18

Junior Year

First Semester

- 2 - B E 357 Machine Unit Operations
- 3 - COMM 250 Public Speaking
- 2 - E C E 307 Basic Electrical Engineering
- 3 - E M 304 Mechanics of Materials
- 3 - M E 310 Thermodynamics and Heat Transfer
- 3 - Biological Science Requirement²

16

Second Semester

- 3 - B E 322 Small Watershed Hydrology and Sedimentology
- 2 - B E 333 Environmental Modification
- 2 - B E 350 Microcomputer Controls in Biosys.
- 3 - B E 362 Energy Conversion for Biosystems
- 4 - C E 341 Introduction to Fluid Mechanics
- 4 - CSENV 202 Soils

18

Senior Year

First Semester

- 3 - B E 416 Biosystems Engr. Capstone Design
- 3 - B E 430 Problem Solving Methods and Models in Biosystems Engineering
- 2 - B E 431 Structural Design for Biosystems
- 3 - B E 450 Instrumentation for Biosys. Engineers
- 3 - Approved Engineering Requirement¹
- 3 - Elective

17

Second Semester

- 3 - B E 364 Nonpoint Source Poll. Mgt. and Cont.
- 2 - B E 421 Engr. Systems for Soil Water Mgt.
- 2 - B E 471 Engineering Research and Mgt.
- 3 - ECON 211 Principles of Microeconomics or
- 3 - ECON 200 Economics Concepts¹
- 3 - Humanities/Social Science Requirement¹
- 5 - Elective

18

135 Total Semester Hours

¹See Policy on Humanities and Social Sciences for Engineering Curricula.

²See advisor.

³ECON 211 is preferred.

CERAMIC AND MATERIALS ENGINEERING

Bachelor of Science

The School of Materials Science and Engineering offers undergraduate degrees in Ceramic and Materials Engineering, Polymer and Textile Chemistry, and Textile Management.

Ceramic and materials engineers design, develop, and participate in the manufacture of both standard and new materials intended for use in a wide variety of industries with diverse applications. These range from the semi-conductor to the aerospace and finally to the traditional ceramics industry. The broad scope of industrial responsibilities handled by ceramic and materials engineers requires knowledge in mathematics, science, engineering, and the social sciences, skills in problem solving, engineering analysis, design, and written and oral communication.

The baccalaureate program integrates laboratory with classroom experiences to prepare students for life-long learning. Courses covering thermodynamics, kinetics, mechanical behavior, processing, and characterization of materials prepare students for careers in industry and/or for graduate school.

In addition to the common educational objectives of all engineering programs listed on page 77, baccalaureate degree graduates in Ceramic and Materials Engineering will be able to

- demonstrate learning consistent with Accreditation Board for Engineering and Technology Engineering Criteria 2000 for ceramic and materials engineering programs;
- function easily and well in the laboratory and plant environments; and
- serve the local, national, and international ceramic and materials communities.

Specifically, the Accreditation Board for Engineering and Technology Engineering Criteria 2000 requires that baccalaureate degree graduates in Ceramic and Materials Engineering be able to

- apply advanced scientific and engineering principles to ceramic and materials engineering systems;
- demonstrate an integrated understanding of the scientific and engineering principles underlying structure, properties, processing, and performance relationships;
- apply this understanding to the solution of ceramic and materials engineering selection and design problems; and
- apply appropriate experimental, statistical, and computational methods to advantage in the solution of ceramic and materials problems.

Sophomore Year

First Semester

- 3 - C M E 210 Intro. to Materials Science
- 1 - C M E 241 Metrics Lab.
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 3 - Humanities/Social Science Requirement¹
- 3 - Literature Requirement¹

17

Second Semester

- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - TEXT 324 Textile Statistics
- 3 - Humanities/Social Science Requirement¹
- 3 - Elective

18

Junior Year

First Semester

- 3 - C M E 221 Materials Processing I
- 3 - C M E 226 Thermodynamics of Materials
- 3 - COMM 250 Public Speaking
- 3 - I E 384 Engineering Economic Analysis
- 3 - PTC 303 Textile Chemistry
- 3 - Elective

18

Second Semester

- 3 - C M E 227 Transport Phenomena
- 3 - C M E 228 Phase Diagrams for Materials Processing and Applications
- 3 - C M E 320 Mechanical Behavior of Materials
- 2 - C M E 342 Structure/Property Lab.
- 3 - C M E 361 Processing of Metals and Their Composites
- 3 - Humanities/Social Science Requirement¹

17

Senior Year

First Semester

- 3 - C M E 303 Noncrystalline Materials
- 3 - C M E 402 Solid State Materials
- 3 - C M E 432 Manufacturing Processes and Syst.
- 1 - C M E 441 Manufacturing Lab.
- 3 - PTC 415 Intro. to Polymer Science and Engr.
- 3 - Elective

16

Second Semester

- 3 - C M E 323 Combustion Systems and Environmental Emissions
- 3 - C M E 407 Senior Capstone Design
- 3 - C M E 416 Electronic Properties of Materials
- 3 - C M E 424 Optical Materials and Their Applications
- 4 - Elective

16

134 Total Semester Hours

¹See Policy on Humanities and Social Sciences for Engineering Curricula.

CHEMICAL ENGINEERING

Bachelor of Science

Chemical engineering is based on chemistry, physics, and mathematics. The curriculum at Clemson includes a blend of classroom and laboratory instruction and emphasizes broadly applicable fundamental principles and current technology to prepare graduates for immediate, productive employment as well as life-long learning and professional growth. Communication skills and group projects are emphasized because chemical engineers frequently work in multidisciplinary teams. Graduates are prepared to function effectively in chemical and related industries and postgraduate school; to identify, formulate, and solve chemical engineering problems; to develop skills for the successful practice of their profession; and to serve their chosen profession. Chemical engineers are involved in the research, manufacture, sales, and use of commodity and specialty chemicals, petroleum products, synthetic fibers and textiles, pharmaceuticals, pulp and paper, electronic components, food and consumer goods, and many other products. They work at the forefront of environmental pollution prevention and remediation and apply engineering science and technology to solve a variety of medical and health-related problems.

In addition to the Bachelor of Science, the Department of Chemical Engineering offers advanced study leading to the Master of Science and Doctor of Philosophy degrees. Additional information can be found on the Web at www.ces.clemson.edu/chemeng.

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry
- 4 - CH E 211 Intro. to Chemical Engineering
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 3 - Literature Requirement¹

19

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 229 Organic Chemistry Lab.
- 3 - CH E 220 Chemical Engr. Thermodynamics I
- 3 - CH E 311 Fluid Flow
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - Literature Requirement¹

17

Junior Year

First Semester

- 1 - CH 339 Physical Chemistry Lab.
- 3 - CH E 312 Heat and Mass Transfer
- 3 - CH E 321 Chemical Engr. Thermodynamics II
- 3 - E M 201 Engineering Mechanics: Statics
- 3 - MTHSC 302 Statistics for Science and Engr. or
3 - EX ST 411 Statistical Methods for Process Development and Control
- 3 - Humanities/Social Science Requirement¹
- 3 - Elective²

19

Second Semester

- 3 - CH 332 Physical Chemistry
- 1 - CH 340 Physical Chemistry Lab.
- 3 - CH E 307 Unit Operation Lab. I
- 1 - CH E 344 Chemical Engr. Junior Seminar
- 3 - CH E 353 Process Dynamics and Control
- 3 - CH E 413 Separation Processes
- 3 - Humanities/Social Science Requirement¹

17

Senior Year

First Semester

- 3 - CH E 319 Engineering Materials
- 3 - CH E 407 Unit Operations Lab. II
- 3 - CH E 431 Process Development, Design, and Optimization of Chemical Engr. Systems I
- 3 - CH E 450 Chemical Reaction Engineering
- 3 - Technical Requirement¹
- 3 - Elective²

18

Second Semester

- 5 - CH E 432 Process Development, Design, and Optimization of Chemical Engr. Systems II
- 1 - CH E 444 Chemical Engr. Senior Seminar II
- 3 - Advanced Chemistry Requirement¹
- 3 - Technical Requirement¹
- 4 - Elective²

16

138 Total Semester Hours

¹See advisor for Policy on Humanities and Social Sciences for Engineering Curricula.

²See advisor for recommendations.

³See advisor.

Note: No student may exceed a maximum of two attempts, including a W, to complete successfully any CHE course.

CIVIL ENGINEERING

Bachelor of Science

Civil Engineering involves the planning, design, construction management, operation, and maintenance of facilities and systems in the built environment including bridges, buildings, airports, water supply systems, ports, dams, and highways.

The Civil Engineering program leads to the Bachelor of Science degree in Civil Engineering and includes the common educational objectives listed on page 77 for the College of Engineering and Science. The first two years provide students with building blocks necessary to be successful civil engineers. This includes proficiency in calculus, statistics, probability, physics, and chemistry. During the junior year, students receive a broad introduction to the fundamental areas of civil engineering (structures, hydraulics, geotechnical, transportation, environmental, construction materials, and project management). Design experiences are integrated throughout the curriculum, culminating in the senior year with a major capstone design project. In addition, during the senior year, students can select from available emphasis areas which serve to strengthen their undergraduate background.

The Civil Engineering program prepares students to work immediately upon graduation in most areas of civil engineering or to pursue graduate degrees. Students are also exposed to issues related to professional practice, including professional registration, life-long learning, and communication and team skills. Because a concerned society demands a realistic consideration of the impacts of engineering projects, civil engineering students are also educated in the broad areas of the humanities and social sciences.

The Department of Civil Engineering allows students to count up to six hours of graduate credit (600- and 800-level courses) toward both the bachelor's and master's degrees. Students participating in this program must have completed the junior year, must have earned a minimum 3.4 grade-point ratio, and must be admitted to the Graduate School prior to registering for graduate courses. Details of the suggested curriculum and program information are available from the department.

The complete objectives of the program can be found on the Web at www.ce.clemson.edu.

Sophomore Year

First Semester

- 3 - C E 251 Analysis Techniques in Civil Engr.
- 3 - C E 255 Geomatics
- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II

18

Second Semester

- 4 - C E 200 Structural Mechanics
- 2 - C E 253 Civil Engineering Measurements
- 3 - COMM 250 Public Speaking
- 3 - E M 202 Engineering Mechanics: Dynamics
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 1 - Elective

17

Junior Year

First Semester

- 3 - C E 301 Structural Analysis
- 4 - C E 311 Introduction to Fluid Mechanics
- 3 - C E 351 Civil Engineering Materials
- 2 - C E 352 Economic Evaluation of Projects
- 3 - ENGL 314 Technical Writing
- 3 - EX ST 301 Introductory Statistics

18

Second Semester

- 3 - C E 311 Transportation Engr. Plan. and Design
- 4 - C E 321 Geotechnical Engineering
- 3 - C E 331 Construction Engineering and Mgt.
- 3 - C E 342 Applied Hydraulics and Hydrology
- 1 - C E 353 Professional Seminar
- 3 - EE&S 401 Environmental Engineering

17

Senior Year

First Semester

- 6 - Humanities/Social Science Requirement¹
- 3 - Technical Design Requirement²
- 3 - Technical Requirement³
- 6 - Elective

18

Second Semester

- 3 - C E 459 Capstone Design Project
- 3 - Humanities/Social Science Requirement¹
- 3 - Literature Requirement⁴
- 3 - Technical Requirement¹
- 3 - Elective

15

135 Total Semester Hours

¹See policy on Humanities and Social Sciences for Engineering Curricula.²See department policy on Technical Design Requirement.³See policy on Technical Requirements. Technical Requirements and electives may be used to complete an emphasis area in one of the following fields: Applied Fluid Mechanics, Construction, Environmental Engineering, Geotechnical/Geoenvironmental Engineering, Structural Engineering.⁴Select from sophomore literature courses (200 level only) or foreign language literature (300 level or higher).

Note: Civil Engineering students may neither enroll in nor receive credit for any C/E or E/M courses unless they have a 2.0 engineering grade-point ratio and a grade of C or better in course prerequisites that have a C/E or E/M designation. Exceptions: 1) Students may always re-enroll in C/E courses which they have previously completed with a grade of C or lower. 2) Students need not have a C or better in 300-level C/E courses to enroll in C/E 459 (see course prerequisites).

COMPUTER ENGINEERING**Bachelor of Science**

Computer engineers have excellent career opportunities in the design and application of hardware and software components for a variety of computer applications. These include mainframe, desktop, and embedded microprocessor platforms as well as the networking of various types of computers and peripherals.

Based on a strong foundation in mathematics, computer science, and the physical sciences, the Computer Engineering program includes engineering science and design in circuits, electronics, computer organizations and design, peripheral interfacing, and software engineering. Emphasis is placed on hands-on experience with networked computer systems, micro-, mini-, and mainframe computers, and the solution of a wide range of practical problems, using engineering principles. In addition to these technical skills, students learn to communicate effectively and to develop interpersonal, teamwork, and management skills, all of which contribute to success in a professional engineering career. The program is also an excellent preparation for graduate study.

The program also includes significant elective hours that allow students to specialize in one or more technical areas or to further broaden the educational base to enable career growth in a desired direction. Detailed information on the program and its objectives can be found on the Web at www.ece.clemson.edu.

Sophomore Year**First Semester**

- 4 - CP SC 210 Programming Methodology or
- 4 - CP SC 102 Computer Science II
- 3 - E C E 201 Logic and Computing Devices
- 3 - E C E 202 Electric Circuits I
- 1 - E C E 211 Electrical Engineering Lab. I
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II

18

Second Semester

- 4 - CP SC 212 Algorithms and Data Structures
- 1 - E C E 212 Electrical Engineering Lab. II
- 3 - E C E 262 Electric Circuits II
- 4 - E C E 272 Computer Organization
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra

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Junior Year**First Semester**

- 1 - E C E 311 Electrical Engineering Lab. III
- 3 - E C E 320 Electronics I
- 3 - E C E 329 Computer Systems Structures
- 3 - E C E 330 Signals, Systems, and Transforms
- 4 - E C E 371 Microcomputer Interfacing
- 3 - MTHSC 419 Discrete Math. Structures I
- 1 - Elective

18

Second Semester

- 3 - E C E 317 Random Signal Analysis
- 3 - E C E 327 Digital Computer Design
- 3 - E C E 352 Programming Systems
- 3 - Engineering Science Requirement¹
- 3 - Humanities/Social Science Requirement²
- 3 - Oral Communication Requirement¹

18

Senior Year**First Semester**

- 9 - Computer Engineering Technical Requirement¹
- 3 - Humanities/Social Science Requirement²
- 6 - Elective

18

Second Semester

- 3 - E C E 453 Software Practicum
- 6 - Computer Engineering Depth Requirement^{1,3}
- 3 - Humanities/Social Science Requirement²
- 3 - Literature Requirement²
- 3 - Elective

18

141 Total Semester Hours

¹Select from list of courses approved by the department.²See Policy on Humanities and Social Sciences for Engineering Curricula.³One course that satisfies the Computer Engineering Technical Requirement must also satisfy the Computer Engineering Depth Requirement (selected from a department-approved list).

Notes:

- 1. A student is allowed to enroll in E C E courses (excluding E C E 307, 308, 309) only when all prerequisites, as defined by current official listings for that course, have been passed with a grade of C or better.
- 2. All Computer Engineering students must have a cumulative engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level E C E courses.
- 3. No student may exceed a maximum of two attempts, including a W, to complete successfully any E C E course.

ELECTRICAL ENGINEERING**Bachelor of Science**

Electrical engineers are in high demand for a wide range of influential positions. Professional duties range from analytical problem solving to the design of components and systems. The scope of employment requires a unique breadth and depth of knowledge and technical skills, which are reflected in the Electrical Engineering program. This program also offers an excellent preparation for graduate education. Detailed information can be found on the Web at www.ece.clemson.edu.

Building on a foundation of mathematical and physical sciences, students progress into the application of these in the engineering science areas of circuits, electronics, communications, controls, power, and electromagnetics. In these subjects, students also begin to apply the concepts and techniques learned to the design of circuits and systems. Senior technical design courses offer the opportunity to further develop expertise in a selected area.

In addition to these technical skills, students learn to communicate effectively, both orally and with the written word. Because engineers work for the benefit of society, the curriculum includes a strong component of humanities and social science courses. Also, many project design assignments enable the development of interpersonal, teamwork, and management skills which are necessary for success in a professional engineering career.

Sophomore Year**First Semester**

- 3 - CP SC 111 Elem. Computer Prog. in C/C++
- 3 - E C E 201 Logic and Computing Devices
- 3 - E C E 202 Electric Circuits I
- 1 - E C E 211 Electrical Engineering Lab. I
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II

17

Second Semester

- 1 - E C E 212 Electrical Engineering Lab. II
- 3 - E C E 262 Electric Circuits II
- 4 - E C E 272 Computer Organization
- 3 - E M 201 Engineering Mechanics: Statics
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - Elective

18

Junior Year**First Semester**

- 1 - E C E 311 Electrical Engineering Lab. III
- 3 - E C E 320 Electronics I
- 3 - E C E 330 Signals, Systems, and Transforms
- 4 - E C E 371 Microcomputer Interfacing
- 3 - E C E 380 Electromagnetics
- 3 - Technical Requirement (Advanced Mathematics)¹

17

Second Semester

- 1 - E C E 312 Electrical Engineering Lab. IV
 - 3 - E C E 317 Random Signal Analysis
 - 3 - E C E 321 Electronics II
 - 3 - E C E 360 Electric Power Engineering
 - 3 - E C E 381 Fields, Waves, and Circuits
 - 3 - Humanities/Social Science Requirement²
- 16

Senior Year**First Semester**

- 3 - E C E 409 Continuous and Discrete Syst. Des.
 - 3 - E C E 427 Communications Systems
 - 2 - E C E 495 Integrated System Design I
 - 3 - M E 310 Thermodynamics and Heat Transfer
 - 3 - Literature Requirement²
 - 3 - Technical Requirement (Electrical and Computer Engineering)¹
- 17

Second Semester

- 2 - E C E 496 Integrated System Design II
 - 6 - Humanities/Social Science Requirement²
 - 3 - Technical Requirement (Electrical and Computer Engineering)¹
 - 7 - Elective
- 18

135 Total Semester Hours

¹Select from list maintained in the department.²See Policy on Humanities and Social Sciences for Engineering Curricula.**Notes:**

1. A student is allowed to enroll in E C E courses (excluding E C E 307, 308, 309) only when all prerequisites have been passed with a grade of C or better.
2. All Electrical Engineering students must have a cumulative engineering grade-point ratio of 2.0 to enroll in any 300- or 400-level E C E courses. In addition, no student may exceed a maximum of two attempts, including a W, to complete successfully any E C E course.

**INDUSTRIAL
ENGINEERING****Bachelor of Science**

Industrial engineers design, install, and improve the complex systems that provide goods and services vital to our society and economy. These systems place unique demands for breadth of preparation on industrial engineers. Baccalaureate degree graduates demonstrate the ability to design, develop, implement, and improve integrated systems that include people, materials, information, equipment, and energy. Graduates will demonstrate the ability to apply the principles and techniques of industrial engineering analysis and design supported by a foundation in mathematical, physical and social sciences, and economic, operational, and engineering analyses. Graduates will possess a breadth of knowledge that allows them to practice industrial engineering with an appropriate awareness of information issues in systems improvement. In addition, graduates are able to work and communicate effectively with colleagues at every level in the organization.

The traditional arenas for the practice of industrial engineering are the manufacturing facilities of industry; however, many practicing industrial engineers are employed in non-manufacturing institu-

tions such as hospitals, banks, and government agencies. In addition to numerous employment opportunities in professional practice, industrial engineering graduates may further their formal education. The Department of Industrial Engineering offers programs leading to the Master of Science and Doctor of Philosophy degrees.

The Department of Industrial Engineering allows students to count up to 12 hours of graduate credit (approved 600- and 800-level courses) toward both the bachelor's and master's degrees. Students participating in this program must have a minimum grade-point ratio of 3.4 and be admitted to the Graduate School prior to registering for graduate courses. Details of the suggested curriculum and program information are available from the Industrial Engineering Department.

Detailed curriculum and department information is available on the Web at www.ces.clemson.edu/iel.

Sophomore Year**First Semester**

- 3 - C M E 210 Introduction to Materials Science
 - 4 - I E 201 System Design I
 - 3 - I E 220 Design of Information Systems in Industrial Engineering
 - 4 - MTHSC 206 Calculus of Several Variables
 - 3 - PHYS 221 Physics with Calculus II
- 17

Second Semester

- 3 - E M 201 Engineering Mechanics: Statics
 - 4 - I E 210 Design and Analysis of Work Systems
 - 3 - I E 280 Methods of Operational Research I
 - 4 - MTHSC 208 Intro. to Ord. Diff. Equations
 - 3 - MTHSC 302 Statistics for Science and Eng.
- 17

Junior Year**First Semester**

- 4 - C E 200 Structural Mechanics or
 - 3 - E M 202 Engr. Mechanics: Dynamics or
 - 3 - E M 304 Mechanics of Materials
 - 3 - COMM 250 Public Speaking
 - 2 - E G 209 Intro. to Engr./Computer Graphics
 - 3 - I E 361 Industrial Quality Control
 - 3 - I E 384 Engineering Economic Analysis
 - 3 - M E 310 Thermodynamics and Heat Transfer
- 17-18

Second Semester

- 2 - E C E 307 Basic Electrical Engineering
 - 1 - E C E 309 Electrical Engineering Lab. I
 - 3 - ENGL 314 Technical Writing
 - 1 - I E 368 Prof. Practice in Industrial Engineering
 - 3 - I E 381 Methods of Operational Research II
 - 3 - I E 386 Production Planning and Control
 - 4 - Elective
- 17

Senior Year**First Semester**

- 3 - I E 461 Quality Engineering
 - 3 - I E 482 Systems Modeling
 - 6 - Humanities Requirement E.1 and E.2¹
 - 3 - Technical Requirement²
 - 2 - Elective
- 17

Second Semester

- 3 - I E 467 Systems Design II
 - 6 - Humanities/Social Science Requirement¹
 - 3 - Technical Requirement²
 - 4 - Elective
- 16

133-134 Total Semester Hours

¹See policy on Humanities and Social Sciences for Engineering Curricula.²Select from I E 440, 452, 456, 460, 465, 485, 487, 489.**MECHANICAL
ENGINEERING****Bachelor of Science**

Breadth, individuality, and flexibility are inherent characteristics of the mechanical engineering profession. Mechanical engineers, in a broad sense, make major contributions to the creation of products and systems that benefit mankind. They work in a variety of areas including bioengineering, energy systems, environmental and life-support systems, propulsion and transportation systems, food production, materials processing, automated manufacturing, and construction. A wide spectrum of career opportunities is open to them. The practice of mechanical engineering includes one or more of the following activities: manufacturing, testing, research, development, design, technical management, technical sales and marketing, construction, and teaching.

Preparation for a 40-45 year professional career requires development of the whole person through a balanced program encompassing the humanities, social sciences, communication and computer skills, physical and engineering sciences, design, and laboratory experience. Students start with the physical sciences and communication skills and progress through the engineering sciences, ultimately applying the principles learned in such areas as energy conversion and transfer, mechanical design, and systems analysis. Throughout the curriculum, the fundamental nature of engineering as a problem-solving discipline is emphasized.

Most graduates take positions in industry, government, or business. Many, however, continue their formal education in a graduate program. The Department of Mechanical Engineering offers study leading to the Master of Engineering, Master of Science, and Doctor of Philosophy degrees.

Mechanical Engineering students who have cumulative grade-point ratio or cumulative engineering grade-point ratio (EGPR) below 2.0 are on probation and will have restricted enrollment in classes. Students whose cumulative GPR is below 2.0 are subject to the regulations stipulated under *Continuing Enrollment Policy*. Students on probation for EGPR below 2.0 who fail to recover in the first regular semester (fall or spring) will not be allowed to register for mechanical engineering classes. After one year, such students may petition the Mechanical Engineering Department for continued enrollment. An advising policy for students on probation is available from the Mechanical Engineering Department.

Additional information can be found on the Web at www.ces.clemson.edu/me.

Sophomore Year

First Semester

- 2 - E G 209 Intro. to Engr./Comp. Graphics
- 3 - E M 201 Engineering Mechanics: Statics
- 3 - M E 202 Foundations of Mechanical Systems
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 3 - Humanities/Social Science Requirement¹

Second Semester

- 2 - E C E 307 Basic Electrical Engineering
- 1 - E C E 309 Electrical Engineering Lab. I
- 3 - E M 202 Engineering Mechanics: Dynamics
- 3 - M E 203 Found. of Thermal and Fluid Syst.
- 2 - M E 205 Computer Analysis in Engineering
- 1 - M E 221 Mechanical Engineering Lab. I
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations

Junior Year

First Semester

- 3 - E M 304 Mechanics of Materials
- 3 - E M 320 Fluid Mechanics
- 3 - EX ST 411 Statistical Methods for Process Development and Control or
- 3 - MTHSC 302 Stats. for Science and Engr.
- 3 - M E 303 Thermodynamics
- 2 - M E 322 Mechanical Engineering Lab. II
- 3 - Humanities/Social Science Requirement¹

Second Semester

- 3 - M E 301 Materials for Mech. Engr. Appl.
- 3 - M E 304 Heat Transfer
- 3 - M E 305 Model. and Analysis of Dynamic Syst.
- 3 - M E 306 Fundamentals of Machine Design
- 2 - M E 323 Mechanical Engineering Lab. III
- 3 - Elective

Senior Year

First Semester

- 3 - M E 401 Mechanical Engineering Design
- 3 - M E 404 Manufacturing Processes and Their Application
- 1 - M E 424 Mechanical Engineering Lab. IV
- 3 - Literature Requirement²
- 3 - Technical Requirement³
- 4 - Elective

Second Semester

- 1 - M E 400 Senior Seminar
- 3 - M E 402 Internship in Engineering Design
- 3 - Humanities/Social Science Requirement¹
- 6 - Technical Requirement¹
- 3 - Elective

133 Total Semester Hours

¹Select from list of approved courses.

²Select from 200-level literature or 300-level and higher foreign language literature courses.

³See advisor.

⁴Note: A student is allowed to enroll in any M E or E M course only when all prerequisites, as defined by current official listings for that course, have been passed with a grade of C or better.

SCIENCE PROGRAMS

The College offers curricula leading to the Bachelor of Science in Chemistry, Computer Information Systems, Computer Science, Geology, Mathematical Sciences, and Physics. The Bachelor of Arts is offered with a major in Chemistry, Computer Science, Geology, Mathematical Sciences, and Physics.

The science departments in the College work closely with the other academic departments in the University, including such disciplines as economics and management as well as engineering. This allows students in the sciences great flexibility and responsibility in designing their own programs.

Bachelor of Science Curricula

The Bachelor of Science degree prepares graduates for professional employment or graduate study in the chosen science discipline. BS curricula are thus more highly structured than BA curricula, but nonetheless offer ample opportunity for students to pursue a minor or secondary area of interest.

Bachelor of Arts Curricula

The curricula leading to the Bachelor of Arts degree are designed to meet the needs of students who desire a broad general education. They require a minor (or a second major) as well as the major concentration. A major requires a minimum of 24 credits from courses above the sophomore level including or in addition to courses specified by the major department. In some major disciplines, certain prescribed courses at the sophomore level are counted toward the 24 credit requirement.

Students have a large degree of flexibility and responsibility in selecting the minor area from those listed on page 93. The courses for these minors are to be selected in consultation with the appropriate department.

CHEMISTRY

Bachelor of Science

Chemistry, an experimental discipline based on observation guided by molecular theory, is of fundamental importance in much of modern science and technology. Its molecular concepts form the basis for ideas about complex material behavior. Due to the fundamental nature and extensive application of chemistry, an unusually large variety of challenging opportunities to contribute in the science-oriented community are open to students whose education is built around the principles of this discipline.

The curriculum, through the career requirement options and the large number of electives, provides students the opportunity to select a coherent program of study beyond the basic courses. Career requirement options are provided for students anticipating graduate study in chemistry or related fields; employment following the BS degree in laboratory, production, technical sales, or management positions; professional studies (e.g., medicine); chemical physics; geochemistry; and employment in fields requiring extensive preparation in courses other than sciences (e.g., patent law and technical writing). Significant features of the curriculum are the student's extensive participation in experimental work and the opportunity to take part in a research investigation during the junior and senior years.

Freshman Year

First Semester

- 4 - CH 101 General Chemistry
- 1 - CH 141 Chemistry Orientation
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Computer Skills Requirement¹

Second Semester

- 4 - CH 102 General Chemistry
- 2 - CH 205 Intro. to Inorganic Chemistry
- 1 - CH 206 Inorganic Chemistry Lab.
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I

Sophomore Year

First Semester

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 4 - Foreign Language Requirement²

Second Semester

- 3 - CH 224 Organic Chemistry
- 1 - CH 228 Organic Chemistry Lab.
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 4 - Foreign Language Requirement²

Junior Year

First Semester

- 3 - CH 313 Quantitative Analysis
- 2 - CH 315 Quantitative Analysis Lab.
- 2 - CH 331 Physical Chemistry
- 1 - CH 339 Physical Chemistry Lab.
- 3 - Humanities Requirement³
- 3 - Literature Requirement⁴
- 3 - Oral Communication Requirement⁵

Second Semester

- 3 - CH 332 Physical Chemistry
- 1 - CH 340 Physical Chemistry Lab.
- 3 - CH 411 Instrumental Analysis
- 2 - CH 412 Instrumental Analysis Lab.
- 3 - ENGL 314 Technical Writing
- 3 - Social Science Requirement¹

Senior Year

First Semester

- 3 - BIOCH 301 Molecular Biochemistry
- 3 - CH 402 Inorganic Chemistry
- 3 - CH 443 Research Problems
- 3 - Chemistry Requirement⁶
- 3 - Social Science Requirement¹
- 3 - Elective

Second Semester

- 3 - CH 444 Research Problems
 - 3 - Chemistry Requirement⁶
 - 9 - Elective
-
- 15

130 Total Semester Hours

¹CP SC 120, 111, or other C.3 course selected from departmental list.²Two semesters of the same modern language.³See General Education Requirements. See also other college requirements.⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁵COMM 150, 250, 251, or as approved by advisor.⁶See advisor. CH 421 and 435 are recommended for students qualifying for graduate studies.**CHEMISTRY****Bachelor of Arts****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
 - 1 - CH 141 Chemistry Orientation
 - 3 - ENGL 101 Composition I
 - 4 - MTHSC 106 Calculus of One Variable I
 - 3 - Computer Skills Requirement¹
-
- 15

Second Semester

- 4 - CH 102 General Chemistry
 - 2 - CH 205 Introduction to Inorganic Chemistry
 - 3 - ENGL 102 Composition II
 - 4 - MTHSC 108 Calculus of One Variable II
 - 3 - PHYS 122 Physics with Calculus I
-
- 16

Sophomore Year**First Semester**

- 3 - CH 223 Organic Chemistry²
 - 1 - CH 227 Organic Chemistry Lab.²
 - 4 - MTHSC 206 Calculus of Several Variables
 - 3 - PHYS 221 Physics with Calculus II
 - 4 - Foreign Language Requirement³
-
- 15

Second Semester

- 3 - CH 224 Organic Chemistry²
 - 1 - CH 228 Organic Chemistry Lab.²
 - 3 - HIST 173 Western Civilization
 - 4 - Foreign Language Requirement³
 - 3 - Literature Requirement⁴
 - 3 - Elective
-
- 17

Junior Year**First Semester**

- 3 - CH 313 Quantitative Analysis
 - 1 - CH 317 Quantitative Analysis Lab.
 - 3 - HIST 173 Western Civilization
 - 3 - Foreign Language Requirement³
 - 3 - Humanities Requirement E.2⁵
 - 3 - Minor⁶
-
- 16

Second Semester

- 3 - CH 331 Physical Chemistry
 - 3 - ENGL 314 Technical Writing
 - 3 - Foreign Language Requirement³
 - 6 - Minor⁶
 - 3 - Oral Communication Requirement⁷
-
- 18

Senior Year**First Semester**

- 3 - CH 332 Physical Chemistry
 - 3 - Chemistry Requirement⁸
 - 3 - Minor⁶
 - 9 - Elective
-
- 18

Second Semester

- 3 - Chemistry Requirement⁸
 - 3 - Minor⁶
 - 9 - Elective
-
- 15

130 Total Semester Hours

¹CP SC 111, 120, or other C.3 course selected from departmental list.²CH 223/227 and 224/228 will count toward the 24 hours of the Chemistry major.³Four semesters of the same modern language.⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁵See General Education Requirements. See also other college requirements.⁶See minors on page 93.⁷COMM 150, 250, 251, or other O.3 course selected from departmental list.⁸See advisor.**COMPUTER
INFORMATION SYSTEMS****Bachelor of Science**

The Computer Information Systems degree program is oriented toward computer applications in management-related problems. The program emphasizes functional areas of management including accounting, production, marketing, and finance and the applications of computers in these areas. The curriculum is designed to prepare students for careers in areas such as systems design and analysis, applications programming, database administration, and information retrieval as well as for continued study toward an advanced degree.

Students who change majors into Computer Information Systems must have a cumulative grade-point ratio of 2.0 or higher.

Additional information can be found on the Web at www.cs.clemson.edu.

Freshman Year**First Semester**

- 4 - CP SC 101 Computer Science I
 - 3 - ENGL 101 Composition I
 - 4 - MTHSC 106 Calculus of One Variable I
 - 3 - Humanities Requirement E.2¹
 - 3 - Social Science Requirement¹
-
- 17

Second Semester

- 4 - CP SC 102 Computer Science II
 - 3 - ENGL 102 Composition II
 - 4 - MTHSC 108 Calculus of One Variable II
 - 3 - Natural Science Requirement¹
 - 3 - Social Science Requirement¹
-
- 17

Sophomore Year**First Semester**

- 4 - CP SC 212 Algorithms and Data Structures
 - 3 - ECON 211 Principles of Microeconomics
 - 3 - MTHSC 119 Intro. to Discrete Methods
 - 3 - Literature Requirement¹
 - 4 - Natural Science Requirement²
-
- 17

Second Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 3 - CP SC 215 Tools and Tech. for Software Dev.
 - 4 - CP SC 231 Intro. to Computer Organization
 - 1 - CP SC 291 Seminar in Professional Issues I
 - 3 - MTHSC 210 Applied Matrix Algebra or
 - 3 - MTHSC 311 Linear Algebra
 - 4 - Natural Science Requirement²
-
- 18

Junior Year**First Semester**

- 3 - ACCT 202 Managerial Accounting Concepts
 - 3 - CP SC 332 Computer Systems⁴
 - 3 - MKT 301 Principles of Marketing
 - 3 - MTHSC 301 Stat. Theory and Methods I or
 - 3 - MTHSC 302 Stats. for Science and Engr.
 - 3 - Oral Communication Requirement³
-
- 15

Second Semester

- 3 - CP SC 360 Distributed and Network Prog.
 - 3 - CP SC 372 Intro. to Software Development
 - 3 - ENGL 314 Technical Writing
 - 3 - MGT 301 Principles of Management
 - 3 - Elective
-
- 15

Senior Year**First Semester**

- 3 - CP SC 462 Database Management Systems
 - 1 - CP SC 491 Seminar in Professional Issues II⁶
 - 3 - Business Requirement⁷
 - 3 - Computer Science Requirement⁸
 - 4 - Elective
-
- 14

Second Semester

- 3 - MGT 312 Decision Models for Management
 - 3 - Business Requirement⁷
 - 3 - Computer Science Requirement⁸
 - 3 - Humanities/Social Science Requirement¹
 - 3 - Elective
-
- 15

128 Total Semester Hours

¹See General Education Requirements.²Select from BIOL 101/102, 103/104, 110/111; CH 101/102, 105/106; PHYS 122/124/221/223, 207/208. The other three hours may be selected from EN SP 200 or any course designated BIOL, CH, GEOL, BIOCH, BIOSC, MICRO, or PHYS.

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

²For a stronger emphasis on operating systems, CP SC⁴ 422 may be substituted.

³COMM 150, 250, or 251.

⁴CP SC H395 may be substituted.

⁵Select from FIN 306, MGT 390, 400.

⁶CP SC 330, 350, or any 400-level CP SC⁴ course except 422.

Notes:

1. For graduation, a candidate for the BS degree in Computer Information Systems must have earned a grade of C or better in each CP SC course applied to the degree.

2. Before enrolling in a CP SC course, a grade of C or better must be earned in all prerequisite courses (including CP SC, E C E, and MTHSC courses).

3. No student may exceed a maximum of two attempts, excluding a W, to complete successfully a CP SC course.

COMPUTER SCIENCE

Bachelor of Science

The Computer Science degree program is oriented toward design, implementation, and application of software systems to solve information processing problems. Emphasis areas outside computer science allow the program to be tailored to the needs and interests of individual students. This program is more technically oriented than the Computer Information Systems curriculum. It prepares students for employment in the computer software field or for continued study toward an advanced degree in computer science. This program is accredited by the Computing Accreditation Commission of the Accreditation Board for Engineering and Technology (ABET).

Students who change majors into Computer Science must have a cumulative grade-point ratio of 2.0 or better.

Additional information can be found on the Web at www.cs.clemson.edu.

Freshman Year

First Semester

- 4 - CP SC 101 Computer Science I
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - Humanities Requirement E.²
- 3 - Social Science Requirement¹

17

Second Semester

- 4 - CP SC 102 Computer Science II
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - Humanities/Social Science Requirement¹
- 3 - Social Science Requirement¹

17

Sophomore Year

First Semester

- 4 - CP SC 212 Algorithms and Data Structures
- 3 - MTHSC 119 Intro. to Discrete Methods
- 3 - PHYS 122 Physics with Calculus I
- 3 - Literature Requirement⁴
- 3 - Elective

16

Second Semester

- 3 - CP SC 215 Tools and Tech. for Software Dev.
- 4 - CP SC 231 Intro. to Computer Organization
- 1 - CP SC 291 Seminar in Professional Issues I
- 3 - E C E 201 Logic and Computing Devices
- 3 - PHYS 221 Physics with Calculus II
- 3 - Oral Communication Requirement¹

17

Junior Year

First Semester

- 3 - CP SC 330 Computer Systems and Networks
- 3 - CP SC 360 Distributed and Network Prog.
- 3 - MTHSC 311 Linear Algebra
- 3 - Emphasis Area⁴
- 4-5 - Natural Science Requirement¹

16-17

Second Semester

- 3 - CP SC 372 Intro. to Software Development
- 3 - CP SC 422 Intro. to Operating Systems
- 3 - ENGL 314 Technical Writing
- 3 - Emphasis Area⁴
- 4-5 - Natural Science Requirement¹

16-17

Senior Year

First Semester

- 3 - CP SC 350 Foundations of Computer Science
- 3 - CP SC 428 Design and Implementation of Programming Languages
- 3 - MTHSC 302 Stats. for Science and Engr. or
- 3 - MTHSC 301 Stat. Theory and Methods I
- 3 - Computer Science Requirement⁶
- 3 - Emphasis Area⁴

15

Second Semester

- 1 - CP SC 491 Seminar in Professional Issues II¹
- 3 - Computer Science Requirement⁶
- 3 - Nontechnical Requirement³
- 7 - Elective

14

128-130 Total Semester Hours

¹See General Education Requirements.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

³COMM 150, 250, or 251.

⁴See advisor.

⁵Select from BIOL 101/102, 103/104, 110/111, CH 101/102, 105/106, GEOL 101/103/102, 112/114. Alternately, if PHYS 124 and 223 are completed, six hours may be selected from EN SP 200 or courses designated as BIOL, BIOCH, BIOSC, CH, GEOL, MICRO, or PHYS.

⁶Select from 400-level CP SC courses. One course must be chosen from CP SC 411, 429, 462, 472.

⁷CP SC H395 may be substituted.

⁸Any course taught outside the College of Engineering and Science and the biological sciences.

Notes:

1. For graduation, a candidate for the BS degree in Computer Science must have earned a grade of C or better in each CP SC course applied to the degree.

2. A grade of C or better must be earned in all prerequisite courses (including CP SC, E C E, and MTHSC courses) before enrolling in the next CP SC course.

3. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any CP SC course.

COMPUTER SCIENCE

Bachelor of Arts

The Bachelor of Arts in Computer Science is ideal for students interested in acquiring a broad-based liberal arts education that includes a strong and solid understanding of computer science. The curriculum is oriented toward design, implementation, and application of computer software systems to solve information processing problems. The program prepares students for employment in the computer software field or for continued study toward an advanced degree in computer science.

Students who change majors into Computer Science must have a cumulative grade-point ratio of 2.0 or higher.

Additional information can be found on the Web at www.cs.clemson.edu.

Freshman Year

First Semester

- 4 - CP SC 101 Computer Science I
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Foreign Language Requirement¹

15

Second Semester

- 4 - CP SC 102 Computer Science II
- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 108 Calculus of One Variable II
- 4 - Foreign Language Requirement¹

18

Sophomore Year

First Semester

- 4 - CP SC 212 Algorithms and Data Structures
- 3 - MTHSC 119 Intro. to Discrete Methods
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement²
- 4 - Natural Science Requirement¹

17

Second Semester

- 3 - CP SC 215 Tools and Tech. for Software Dev.
- 4 - CP SC 231 Intro. to Computer Organization
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement²
- 4 - Natural Science Requirement¹

17

Junior Year

First Semester

- 3 - CP SC 332 Computer Systems⁴
- 3 - CP SC 360 Distributed and Network Prog.
- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 301 Stat. Theory and Methods I or
- 3 - MTHSC 302 Stats. for Science and Engr. or
- 3 - MTHSC 311 Linear Algebra

3 - Minor

15

Second Semester

- 1 - CP SC 291 Seminar in Professional Issues I
 - 3 - CP SC 372 Intro. to Software Development
 - 3 - HIST 173 Western Civilization
 - 3 - Oral Communication Requirement¹
 - 6 - Minor
-
- 16

Senior Year**First Semester**

- 6 - Computer Science Requirement²
 - 3 - Departmental Requirement³
 - 3 - Fine Arts Requirement⁴
 - 3 - Minor
-
- 15

Second Semester

- 3 - Computer Science Requirement²
 - 3 - Minor
 - 10 - Elective
-
- 16

129 Total Semester Hours

¹Four semesters of the same language²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.³Select from BIOL 101/102, 103/104; 110/111; CH 101/102, 105/106; PHYS 122/124/221/223, 207/208⁴For a stronger emphasis on operating systems, CP SC⁴ 422 may be substituted.⁵COMM 150, 250, or 251.⁶CP SC 330, 350, or any 400-level CP SC course except 422. ⁷Select from HIST 198 (three times) or courses in ANTH, PHIL, POSC; 200-level literature, or 300-level foreign language literature.⁸Select from MUSIC 210, 311, THEA 210, or courses in ART or A.H.**Notes:**

1. For graduation, a candidate for the BA degree in Computer Science must have earned a grade of C or better in each CP SC course applied to the degree.

2. A grade of C or better must be earned in all prerequisite courses (including CP SC, E C E, and MTHSC courses) before enrolling in the next CP SC course.

3. No student may exceed a maximum of two attempts, excluding a W, to complete successfully any CP SC course.

GEOLOGY**Bachelor of Science**

Geology involves the physics and chemistry of materials which comprise the earth, but equally important, it considers the development of life on earth. Fundamentally, the chemical, physical, and biological responses to environments on and in the earth must be thoroughly understood so that the historical development of the earth can be deduced, predictions of the future inferred, and natural resources intelligently developed. Industry depends on minerals and rocks; metals have their origin in them as do our chief power sources: coal, petroleum, and radioactive minerals.

Employment opportunities for geologists include such far-reaching fields as mineral-producing industries, railroads, municipalities, engineering firms, and water authorities. It is important, therefore, that a geology education rest on a broad yet rigorous base.

Students pursuing a Bachelor of Science degree in Geology have three concentrations from which to choose. The "traditional" curriculum provides the

fundamentals of geology and excellent support in the other basic sciences. Graduates are prepared for employment or for graduate study in any field of geology. The Environmental Geology concentration prepares students for careers in the environmental consulting industry or graduate school in environmental fields. Students in this concentration take 15 credits of Environmental Science Requirement, including at least nine credits from one of three subdisciplines: geology/soil science, biology/ecology, or chemistry/physics. The Engineering Geology concentration may be taken by students interested in applying engineering principles to geologic problems. Engineering geologists are increasingly called upon to perform geologic site evaluations for construction projects and to minimize the threat of geologic hazards. The curriculum involves courses in engineering and soil mechanics plus 15 credits of Engineering Geology Requirement selected from courses in civil, environmental, and biosystems engineering, or advanced mathematics.

Freshman Year**First Semester**

- 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 1 - GEOL 100 Current Topics in Geology
 - 3 - GEOL 101 Physical Geology
 - 1 - GEOL 103 Physical Geology Lab.
 - 4 - MTHSC 106 Calculus of One Variable I
-
- 16

Second Semester

- 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 4 - GEOL 102 Historical Geology
 - 4 - MTHSC 108 Calculus of One Variable II
-
- 15

Sophomore Year**First Semester**

- 4 - BIOL 103 General Biology I
 - 4 - GEOL 302 Structural Geology
 - 4 - MTHSC 206 Calculus of Several Variables
 - 3 - Literature Requirement¹
-
- 15

Second Semester

- 3 - COMM 250 Public Speaking
 - 3 - CP SC 110 Elementary Computer Prog. or
3 - CP SC 111 Elem. Comp. Prog. in C/C++
 - 4 - GEOL 306 Mineralogy
 - 3 - PHYS 122 Physics with Calculus I
 - 3 - Humanities Requirement E.2²
-
- 16

Junior Year**First Semester**

- 3 - ENGL 314 Technical Writing
 - 3 - GEOL 314 Sedimentary Petrology
 - 3 - PHYS 221 Physics with Calculus II
 - 3 - Social Science Requirement³
 - 3 - Elective
-
- 15

Second Semester

- 3 - EX ST 301 Introductory Statistics
 - 6 - Geology Requirement⁴
 - 3 - Social Science Requirement⁵
 - 3 - Elective
-
- 15

Summer

- 6 - Summer Geology Field Course⁶

Senior Year**First Semester**

- 3 - GEOL 316 Igneous and Metamorphic Petrology
 - 3 - GEOL 403 Invertebrate Paleontology
 - 3 - Technical Requirement⁷
 - 6 - Elective
-
- 15

Second Semester

- 3 - GEOL 401 Applied Geophysics
 - 3 - GEOL 413 Stratigraphy
 - 3 - Geology Requirement⁸
 - 3 - Technical Requirement⁹
 - 5 - Elective
-
- 17

130 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.²See General Education Requirements.³Select from 300- or 400-level geology courses.⁴GEOL 475 or select from departmental list.⁵Choose from departmental list of approved courses.**ENGINEERING GEOLOGY
CONCENTRATION****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
 - 3 - ENGL 101 Composition I
 - 1 - GEOL 100 Current Topics in Geology
 - 3 - GEOL 101 Physical Geology
 - 1 - GEOL 103 Physical Geology Lab.
 - 4 - MTHSC 106 Calculus of One Variable I
-
- 16

Second Semester

- 4 - CH 102 General Chemistry
 - 3 - ENGL 102 Composition II
 - 4 - GEOL 102 Historical Geology
 - 4 - MTHSC 108 Calculus of One Variable II
-
- 15

Sophomore Year**First Semester**

- 3 - CE 255 Geomatics
 - 3 - CP SC 110 Elementary Computer Prog. or
3 - CP SC 111 Elem. Comp. Prog. in C/C++
 - 4 - GEOL 302 Structural Geology
 - 4 - MTHSC 206 Calculus of Several Variables
 - 3 - Literature Requirement¹
-
- 17

Second Semester

- 3 - COMM 250 Public Speaking
- 4 - GEOL 306 Mineralogy
- 4 - MTHSC 208 Intro. to Orl. Diff. Equations
- 3 - PHYS 122 Physics with Calculus I
- 3 - Social Science Requirement¹

17

Junior Year**First Semester**

- 3 - E M 201 Engineering Mechanics: Statics
- 3 - ENGL 314 Technical Writing
- 3 - PHYS 221 Physics with Calculus II
- 3 - Engineering Geology Requirement¹
- 3 - Geology Requirement¹

15

Second Semester

- 3 - E M 304 Mechanics of Materials
- 3 - EX ST 301 Introductory Statistics
- 3 - GEOL 320 Engineering Geology
- 3 - Engineering Geology Requirement¹
- 3 - Humanities Requirement E.2²

15

Summer

- 6 - Summer Geology Field Course⁵

Senior Year**First Semester**

- 3 - GEOL 408 Geohydrology
- 3 - Engineering Geology Requirement¹
- 3 - Social Science Requirement²
- 6 - Elective

15

Second Semester

- 3 - GEOL 401 Applied Geophysics
- 6 - Engineering Geology Requirement¹
- 5 - Elective

14

130 Total Semester Hours¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.²See General Education Requirements.³Select from departmental list of approved courses. A minimum of 15 credits is required.⁴Select from 300- or 400-level geology courses.⁵GEOL 475 or select from departmental list.**ENVIRONMENTAL GEOLOGY
CONCENTRATION****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 1 - GEOL 100 Current Topics in Geology
- 3 - GEOL 101 Physical Geology
- 1 - GEOL 103 Physical Geology Lab.
- 4 - MTHSC 106 Calculus of One Variable I

16

Second Semester

- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 4 - GEOL 102 Historical Geology
- 4 - MTHSC 108 Calculus of One Variable II

15

Sophomore Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - GEOL 302 Structural Geology
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - Literature Requirement¹

15

Second Semester

- 4 - BIOL 104 General Biology II
- 3 - CP SC 110 Elementary Computer Prog. or
- 3 - CP SC 111 Elem. Comp. Prog. in C/C++
- 3 - EN SP 200 Intro. to Environmental Science
- 4 - GEOL 306 Mineralogy
- 3 - PHYS 122 Physics with Calculus I

17

Junior Year**First Semester**

- 3 - COMM 250 Public Speaking
- 3 - GEOL 314 Sedimentary Petrology or
- 3 - GEOL 316 Igneous and Metamorphic Petrology
- 3 - GEOL 318 Introduction to Geochemistry
- 3 - Environmental Science Requirement²
- 3 - Social Science Requirement¹

15

Second Semester

- 3 - ENGL 314 Technical Writing
- 3 - EX ST 301 Introductory Statistics
- 3 - GEOL 300 Environmental Geology
- 3 - Environmental Science Requirement²
- 3 - Humanities Requirement E.2³

15

Summer

- 6 - Summer Geology Field Course⁴

Senior Year**First Semester**

- 3 - EN SP 400 Studies in Environmental Sciences
- 3 - GEOL 408 Geohydrology
- 6 - Environmental Science Requirement²
- 4 - Elective

16

Second Semester

- 3 - GEOL 405 Geomorphology
- 3 - Environmental Science Requirement²
- 3 - Social Science Requirement¹
- 6 - Elective

15

130 Total Semester Hours¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.²Select from departmental list of approved courses. A minimum of 15 credits is required.³See General Education Requirements.⁴GEOL 475 or select from departmental list.**GEOLOGY****Bachelor of Arts****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 1 - GEOL 100 Current Topics in Geology
- 3 - GEOL 101 Physical Geology
- 1 - GEOL 103 Physical Geology Lab.
- 3 - Mathematical Sciences Requirement¹

15

Second Semester

- 4 - CH 102 General Chemistry
- 3 - ENGL 102 Composition II
- 4 - GEOL 102 Historical Geology
- 3 - Mathematical Sciences Requirement¹
- 3 - Elective

17

Sophomore Year**First Semester**

- 3 - COMM 250 Public Speaking
- 4 - GEOL 302 Structural Geology
- 3 - HIST 172 Western Civilization
- 4 - Foreign Language Requirement²
- 3 - Literature Requirement¹

17

Second Semester

- 4 - GEOL 306 Mineralogy
- 3 - HIST 173 Western Civilization
- 3 - Computer Skills Requirement¹
- 4 - Foreign Language Requirement²
- 3 - Literature Requirement¹

17

Junior Year**First Semester**

- 3 - Foreign Language Requirement²
- 6 - Major⁵
- 3 - Minor
- 3 - Elective

15

Second Semester

- 3 - ENGL 314 Technical Writing
- 3 - Foreign Language Requirement²
- 3 - Major⁵
- 3 - Minor
- 3 - Elective

15

Senior Year**First Semester**

- 3 - Major⁵
- 6 - Minor
- 3 - Technical Requirement⁶
- 4 - Elective

16

Second Semester

- 6 - Major⁵
- 3 - Minor
- 3 - Technical Requirement⁶
- 4 - Elective

16

128 Total Semester Hours

¹See General Education Requirements. MTHSC 106 and 108 are recommended.

²German or French is recommended. Two years of the same language are required.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴See General Education Requirements. CP SC 110 or 111 is recommended.

⁵Select from any 300- or 400-level geology courses.

⁶Choose from departmental list of approved courses.

MATHEMATICAL SCIENCES

Bachelor of Science

The Mathematical Sciences curriculum is designed to be versatile. Students gain a broad knowledge of mathematical concepts and methods that are applicable in sciences, engineering, business, industry, and other professions desiring a strong mathematical background. In addition to the basic courses which provide necessary mathematical skills, the curriculum allows students to select an emphasis area or concentration, providing an introduction to a specific area where mathematics is applied. These are Applied Analysis, Biology, Computer Science, Operations Research/Management Science, and Statistics.

In addition to the overall goal of preparing students to cope with a variety of mathematical problems, the curriculum seeks to provide an adequate background for students who plan to pursue graduate study or positions in business, industry, or government. Students electing the Biology Concentration will have the necessary preparation for entering medical school. More information about the degree program can be found on the Web at www.math.clemson.edu.

Freshman Year**First Semester**

- 3 - ECON 200 Economic Concepts or
- 3 - ECON 211 Principles of Microeconomics
- 3 - ENGL 101 Composition I
- 3 - HIST 172 or 173 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Foreign Language Requirement¹

17

Second Semester

- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - MTHSC 129 Prob. Solving in Discrete Math.
- 4 - Foreign Language Requirement¹

17

Sophomore Year**First Semester**

- 4 - MTHSC 206 Calculus of Several Variables
- 1 - MTHSC 250 Intro. to Mathematical Sciences
- 3 - MTHSC 360 Intermediate Math. Computing
- 3 - Literature Requirement²
- 4 - Science Requirement³

15

Second Semester

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra
- 3 - PHYS 122 Physics with Calculus I
- 3 - Literature Requirement²
- 4 - Science Requirement³

17

Junior Year**First Semester**

- 3 - MTHSC 302 Statistics for Science and Engr.
- 3 - MTHSC 440 Linear Programming
- 4-3 - Approved Requirement¹
- 3 - Emphasis Area
- 4 - Science Requirement³

16

Second Semester

- 3 - MTHSC 400 Theory of Probability
- 3 - MTHSC 412 Introduction to Modern Algebra
- 3 - Approved Requirement¹
- 3 - Emphasis Area
- 4 - Science Requirement³

16

Senior Year**First Semester**

- 3 - COMM 250 Public Speaking
- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 450 Intro. to Mathematical Models
- 3 - MTHSC 453 Advanced Calculus I or
- 3 - MTHSC 463 Mathematical Analysis I
- 4 - Approved Requirement¹
- 3 - Emphasis Area

19

Second Semester

- 3 - MTHSC 454 Advanced Calculus II
- 3 - Emphasis Area
- 10 - Elective

16

133 Total Semester Hours**EMPHASIS AREAS****Applied Analysis**

- 3 - MTHSC 435 Complex Variables
- 3 - MTHSC 460 Intro. to Numerical Analysis I
- 6 - Applications Area³

12

Operations Research/Management Science³

- 3 - IE 386 Production Planning and Control or
- 3 - MGT 402 Operations Planning and Cont.
- 3 - IE 482 Systems Modeling or
- 3 - IE 384 Engineering Economic Analysis
- 3 - MTHSC 407 Regress. and Time-Ser. Analysis
- 3 - MTHSC 441 Intro. to Stochastic Models
- 3 - MTHSC 460 Intro. to Numerical Analysis I

15

Statistics

- 3 - MGT 414 Statistical Analysis
- 3 - MTHSC 403 Intro. to Statistical Theory
- 3 - MTHSC 406 Sampling Theory and Methods
- 3 - MTHSC 407 Regress. and Time-Ser. Analysis

12

¹Eight semester hours in the same language are required.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

³Must include two of the following sequences: BIOL 103/104, CH 101/102, ECON 314/405, PHYS 221/223, 222/224. The Operations Research/Management Science emphasis area requires ECON 314/405.

⁴Must be approved by the advisor.

⁵See advisor. Possibilities include CH 331, 332; EM 320; PHYS 321, 322, 441, 442.

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences electives and emphasis area courses.
2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

BIOLOGY CONCENTRATION**Freshman Year****First Semester**

- 5 - BIOL 110 Principles of Biology I¹
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I

15

Second Semester

- 5 - BIOL 111 Principles of Biology II¹
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - MTHSC 129 Prob. Solving in Discrete Math.
- 1 - MTHSC 250 Intro. to Mathematical Sciences

16

Sophomore Year**First Semester**

- 4 - CH 101 General Chemistry
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - MTHSC 360 Intermediate Math. Computing
- 4 - PHYS 207 General Physics I
- 3 - Literature Requirement²

18

Second Semester

- 4 - CH 102 General Chemistry
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra
- 4 - PHYS 208 General Physics II
- 3 - Literature Requirement²

18

Junior Year**First Semester**

- 3 - CH 223 Organic Chemistry
- 1 - CH 227 Organic Chemistry Lab.
- 3 - MTHSC 302 Statistics for Science and Engr.
- 3 - MTHSC 440 Linear Programming
- 4 - Foreign Language Requirement³

2

2 - Elective

16

Second Semester

- 3 - CH 224 Organic Chemistry
 - 1 - CH 228 Organic Chemistry Lab.
 - 3 - MTHSC 400 Theory of Probability
 - 3 - MTHSC 412 Introduction to Modern Algebra
 - 4 - Foreign Language Requirement¹
 - 2 - Elective
-
- 16

Senior Year**First Semester**

- 3 - ECON 200 Economic Concepts or
 - 3 - ECON 211 Principles of Microeconomics
 - 3 - MTHSC 450 Intro. to Mathematical Models
 - 3 - MTHSC 453 Advanced Calculus I or
 - 3 - MTHSC 463 Mathematical Analysis I
 - 3 - Animal or Plant Diversity Requirement¹
 - 4 - Elective
-
- 16

Second Semester

- 3 - COMM 250 Public Speaking
 - 3 - ENGL 314 Technical Writing
 - 3 - HIST 172 or 173 Western Civilization
 - 3 - MTHSC 454 Advanced Calculus II
 - 4-3 - Biological Science Requirement¹
 - 2-3 - Elective
-
- 18

133 Total Semester Hours

¹Those qualifying for advanced placement in languages or wanting to take languages the freshman year may take them in place of these courses.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

³Eight credit hours in the same language are required.

⁴BIOSC 302, 303, 304, or 305.

⁵BIOCH 301, GEN 302/303, MICRO 305, or any 300- and 400-level biological science course.

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences electives and option courses.

2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

COMPUTER SCIENCE CONCENTRATION

Freshman Year**First Semester**

- 3 - ECON 200 Economic Concepts or
 - 3 - ECON 211 Principles of Microeconomics
 - 3 - ENGL 101 Composition I
 - 3 - HIST 172 or 173 Western Civilization
 - 4 - MTHSC 106 Calculus of One Variable I
 - 4 - Foreign Language Requirement¹
-
- 17

Second Semester

- 3 - CP SC 111 Elem. Computer Prog. in C/C++
 - 3 - ENGL 102 Composition II
 - 4 - MTHSC 108 Calculus of One Variable II
 - 3 - MTHSC 129 Prob. Solving in Discrete Math.
 - 4 - Foreign Language Requirement¹
-
- 17

Sophomore Year**First Semester**

- 4 - CP SC 210 Programming Methodology
 - 4 - MTHSC 206 Calculus of Several Variables
 - 1 - MTHSC 250 Intro. to Mathematical Sciences
 - 3 - Literature Requirement²
 - 3-4 - Science Requirement¹
-
- 15-16

Second Semester

- 3 - CP SC 340 Algorithms and Data Structures
 - 4 - MTHSC 208 Intro. to Ord. Diff. Equations
 - 3 - MTHSC 311 Linear Algebra
 - 3 - Literature Requirement²
 - 4 - Science Requirement¹
-
- 17

Junior Year**First Semester**

- 3 - MTHSC 302 Statistics for Science and Engr.
 - 3 - MTHSC 360 Intermediate Math. Computing
 - 3 - MTHSC 440 Linear Programming
 - 3 - PHYS 122 Physics with Calculus I
 - 4 - Science Requirement¹
-
- 16

Second Semester

- 3 - COMM 250 Public Speaking
 - 3 - ENGL 314 Technical Writing
 - 3 - MTHSC 400 Theory of Probability
 - 3 - MTHSC 412 Introduction to Modern Algebra
 - 3-4 - Computer Science Requirement¹
 - 3-4 - Science Requirement¹
-
- 18-20

Senior Year**First Semester**

- 3 - MTHSC 450 Intro. to Mathematical Models
 - 3 - MTHSC 453 Advanced Calculus I or
 - 3 - MTHSC 463 Mathematical Analysis I
 - 3 - MTHSC 460 Intro. to Numerical Analysis I
 - 7-9 - Approved Requirement¹
-
- 16-18

Second Semester

- 3 - MTHSC 454 Advanced Calculus II
 - 3 - Computer Science Requirement¹
 - 10 - Elective
-
- 16

132-137 Total Semester Hours

¹Eight credit hours in the same language are required.

²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

³Must include two of the following sequences: BIOL 103 and 104; CH 101 and 102; ECON 314 and 405; PHYS 221/223 and 222/224.

⁴One of the following sequences: CP SC 231 and 428; 350 and 450; 360 and 462; or any two courses from CP SC 231, 350, 360, 372.

⁵Must be approved by the advisor.

Notes:

1. For graduation, a candidate for the BS degree in Mathematical Sciences will be required to have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences electives and concentration courses.

2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

MATHEMATICAL SCIENCES

Bachelor of Arts**Freshman Year****First Semester**

- 3 - ECON 200 Economic Concepts or
 - 3 - ECON 211 Principles of Microeconomics
 - 3 - ENGL 101 Composition I
 - 3 - HIST 172 Western Civilization
 - 4 - MTHSC 106 Calculus of One Variable I
 - 4 - Foreign Language Requirement¹
-
- 17

Second Semester

- 3 - ENGL 102 Composition II
 - 4 - MTHSC 108 Calculus of One Variable II
 - 3 - MTHSC 129 Prob. Solving in Discrete Math.
 - 3 - Computer Skills Requirement¹
 - 4 - Foreign Language Requirement¹
-
- 17

Sophomore Year**First Semester**

- 4 - MTHSC 206 Calculus of Several Variables
 - 1 - MTHSC 250 Intro. to Mathematical Sciences
 - 3 - Foreign Language Requirement¹
 - 3 - Literature Requirement¹
 - 4 - Science Requirement¹
-
- 15

Second Semester

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
 - 3 - MTHSC 311 Linear Algebra
 - 3 - Foreign Language Requirement¹
 - 3 - Humanities Requirement E.2²
 - 4 - Science Requirement²
-
- 17

Junior Year**First Semester**

- 3 - COMM 250 Public Speaking
 - 3 - MTHSC 302 Statistics for Science and Engr.
 - 3 - MTHSC 360 Intern. Math. Computing or
 - 3 - EDSEC 437 Tech. in Secondary Math.
 - 3 - Minor
 - 3 - Social Science Requirement¹
 - 3 - Elective
-
- 18

Second Semester

- 3 - HIST 173 Western Civilization
 - 3 - Education Requirement¹ or
 - 3 - Humanities Requirement¹
 - 6 - Mathematical Science Requirement⁴
 - 3 - Minor
-
- 15

Senior Year**First Semester**

- 3 - MTHSC 453 Advanced Calculus I or
 - 3 - MTHSC 463 Mathematical Analysis I
 - 6 - Minor
 - 3 - Senior Requirement¹
 - 4 - Elective
-
- 16

Second Semester

- 3 - ENGL 314 Technical Writing
- 3 - Mathematical Science Breadth Requirement⁶
- 3 - Mathematical Science Requirement⁴
- 3 - Minor
- 3 - Elective

15

130 Total Semester Hours

¹Four semesters of the same language.²See advisor.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁴See advisor. Select from MTHSC 308, 400, 412, 454.⁵See advisor. Select from MTHSC 440, 450, H482, EDESC 412.⁶Select from 300- and 400-level MTHSC courses with approval of advisor.**Notes:**

1. For graduation, candidates for the BA degree in Mathematical Sciences must have a 2.0 or higher cumulative grade-point ratio in all required courses taught by the Mathematical Sciences Department including approved mathematical sciences requirements and concentration/emphasis area courses.

2. A grade of C or better must be earned in all prerequisite courses before enrolling in the next MTHSC course.

PHYSICS**Bachelor of Science**

Physics, the most fundamental of the natural sciences, forms the basis of study upon which the other branches of science are founded. Physics is concerned with the fundamental behavior of matter and energy. Classical physics encompasses the fields of mechanics, heat and thermodynamics, electricity and magnetism, acoustics and optics. Modern physics is concerned with the study of atoms and molecules, atomic nuclei, elementary particles and the properties of liquids, crystalline solids, and other materials, as well as the areas of relativity, cosmology, and the large-scale structure of the universe.

The undergraduate Physics curricula are designed to provide students with a strong background in the classical areas of physics as well as an introduction into the more important aspects of modern physics. The BS in Physics curriculum is directed toward preparing students for graduate study ultimately leading to the PhD degree or toward research and development work in industrial or governmental laboratories. It also provides a good background for graduate study or industrial work in many areas or engineering physics and applied science.

Freshman Year**First Semester**

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 1 - PHYS 101 Current Topics in Modern Physics
- 3 - Social Science Requirement¹

15**Second Semester**

- 4 - CH 102 General Chemistry
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I

18**Sophomore Year****First Semester**

- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 4 - Foreign Language Requirement²
- 3 - Literature Requirement³

15**Second Semester**

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 4 - Foreign Language Requirement²
- 3 - Humanities Requirement E.2¹
- 3 - Elective

18**Junior Year****First Semester**

- 3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
- 3 - PHYS 321 Mechanics I
- 3 - PHYS 325 Experimental Physics I
- 3 - Emphasis Area⁴
- 3 - Writing Intensive Requirement⁵

15**Second Semester**

- 3 - PHYS 322 Mechanics II
- 3 - PHYS 326 Experimental Physics II
- 3 - PHYS 355 Modern Physics
- 3 - PHYS 441 Electromagnetics I
- 3 - Emphasis Area⁴
- 3 - Elective

18**Senior Year****First Semester**

- 3 - PHYS 401 Senior Thesis
- 3 - PHYS 442 Electromagnetics II
- 3 - PHYS 455 Quantum Physics I
- 3 - Emphasis Area⁴
- 3 - Social Science Requirement¹

15**Second Semester**

- 3 - PHYS 465 Thermodynamics and Statistical Mechanics
- 3 - Emphasis Area⁴
- 3 - Oral Communication Requirement¹
- 3 - Science Requirement⁵
- 4 - Elective

16

130 Total Semester Hours

¹See General Education Requirements. (Social Science requirement must include either HIST 172 or 173.)²Two semesters in same modern foreign language.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁴Select from Chemistry, Computer Science, Engineering, Environmental Science, Geology, Mathematical Sciences, Physics and Astronomy. Students take a total of 12 credits in one of these areas, at least six of which will normally be at the 300-400 level. It should be noted that the requirements for a minor in one of these areas might be satisfied with three additional credits at the 300-400 level.⁵The Science Requirement will be fulfilled by courses in the disciplines listed in (4) above at the 300-400 level in a discipline other than that chosen for the emphasis area.**BIOPHYSICS CONCENTRATION**

The Biophysics Concentration offers an excellent preparation for medical school or graduate work in biological sciences. It includes the flexibility of selecting courses in chemistry, biological sciences, physics, and mathematics. This concentration also provides the necessary background for employment in industry, manufacturing, and instrumentation for clinical or molecular biology applications.

Freshman Year**First Semester**

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 1 - PHYS 101 Current Topics in Modern Physics
- 3 - Social Science Requirement¹

15**Second Semester**

- 4 - CH 102 General Chemistry
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I

18**Sophomore Year****First Semester**

- 5 - BIOL 110 Principles of Biology I
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 3 - Literature Requirement²

16**Second Semester**

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 4 - Biophysics Requirement¹
- 3 - Humanities Requirement E.2¹
- 3 - Elective

18**Junior Year****First Semester**

- 3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
- 3 - PHYS 321 Mechanics I
- 3 - PHYS 325 Experimental Physics I
- 3 - Biophysics Requirement¹
- 4 - Foreign Language Requirement⁴

16**Second Semester**

- 3 - PHYS 322 Mechanics II
- 3 - PHYS 355 Modern Physics
- 3 - PHYS 441 Electromagnetics I
- 3 - Biophysics Requirement¹
- 4 - Foreign Language Requirement⁴

16

Senior Year**First Semester**

- 3 - PHYS 442 Electromagnetics II
- 3 - PHYS 455 Quantum Physics I
- 3 - Biophysics Requirement¹
- 3 - Writing Intensive Requirement¹
- 3 - Elective

15**Second Semester**

- 3 - PHYS 465 Thermodynamics and Stat. Mech.²
- 3 - Biophysics Requirement¹
- 3 - Oral Communication Requirement¹
- 3 - Social Science Requirement¹
- 4 - Elective

16

130 Total Semester Hours

¹See General Education Requirements.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.³Select from a list of approved courses in physics, chemistry, mathematics, and the biological sciences. At least six credits must be in the biological sciences.⁴Two semesters in the same modern foreign language.⁵An approved physics course may be substituted for PHYS 465 if the student satisfactorily completes CH 331, 332.**PHYSICS****Bachelor of Arts**

The BA in Physics program is ideal for students interested in acquiring a broad-based liberal education that includes a strong and solid understanding of either science or a broad exposure to engineering with a strong physics foundation.

Freshman Year**First Semester**

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 1 - PHYS 101 Current Topics in Modern Physics
- 3 - Social Science Requirement¹

15**Second Semester**

- 4 - CH 102 General Chemistry
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I

18**Sophomore Year****First Semester**

- 4 - MTHSC 206 Calculus of Several Variables
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 4 - Foreign Language Requirement²
- 3 - Literature Requirement¹

15**Second Semester**

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 4 - Foreign Language Requirement²
- 3 - Humanities Requirement I,2¹
- 3 - Elective

18**Junior Year****First Semester**

- 3 - PHYS 311 Intro. to Meth. of Theoretical Phys.
- 3 - PHYS 321 Mechanics I
- 3 - Foreign Language Requirement²
- 3 - Minor
- 3 - Writing Intensive Requirement¹

15**Second Semester**

- 3 - PHYS 322 Mechanics II
- 3 - PHYS 355 Modern Physics
- 3 - PHYS 441 Electromagnetics I
- 3 - Foreign Language Requirement²
- 3 - Minor

15**Senior Year****First Semester**

- 3 - PHYS 325 Experimental Physics I
- 6 - Minor
- 3 - Physics Requirement⁴
- 3 - Social Science Requirement¹
- 3 - Elective

18**Second Semester**

- 3 - Minor
- 3 - Oral Communication Requirement¹
- 3 - Physics Requirement⁴
- 3 - Social Science Requirement¹
- 4 - Elective

16

130 Total Semester Hours

¹See General Education Requirements. (Social science requirement must include either HIST 172 or 173.)²Four semesters in the same modern foreign language.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁴See advisor.**POLYMER AND TEXTILE CHEMISTRY AND TEXTILE MANAGEMENT**

The School of Materials Science and Engineering offers undergraduate degrees in Ceramic and Materials Engineering, Polymer and Textile Chemistry, and Textile Management.

Textile students study the production, structure, and properties of natural and man-made fibers, the processes for converting these fibers into textile structures, the science of coloring agents and finishes to improve the desirability and serviceability of the product, and the methods for evaluating the performance of textile materials.

Graduates of the degree programs in Polymer and Textile Chemistry and Textile Management hold jobs in corporate and personnel management, manufacturing management, design, research, development, technical service, quality control, and sales. They create new products and processes and solve problems. They create styles, patterns, textures, and colors for apparel, home, industry, and special applications. Their jobs utilize computers, automation, and product quality and are concerned with plant design, environmental control, and consumer safety.

The Bachelor of Science in Polymer and Textile Chemistry is based on chemistry, physics, and mathematics. With this firm base, graduates are able to apply their scientific knowledge to the solution of problems in textile and polymer materials involving both chemical and physical principles. Graduates will be concerned with the conception, design, construction, and management of complete systems of labor, machinery, and processes for the most efficient production of textiles or related chemicals. There are two primary emphasis areas in Polymer and Textile Chemistry. Both allow students to prepare for graduate study in Textiles, Fiber, and Polymer Science as well as other disciplines.

POLYMER AND TEXTILE CHEMISTRY**Bachelor of Science****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 3 - TEXT 175 Intro. to Textile Manufacturing
- 3 - History Requirement¹

17**Second Semester**

- 4 - CH 102 General Chemistry
- 3 - CP SC 110 Elem. Computer Programming or 3 - CP SC 120 Intro. to Info. Technology
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - PHYS 122 Physics with Calculus I

17

Sophomore Year

First Semester

- 4 - MTHSC 206 Calculus of Several Variables
 - 3 - PHYS 221 Physics with Calculus II
 - 1 - PHYS 223 Physics Lab. II
 - 4 - Emphasis Area²
 - 3 - Literature Requirement³
-
- 15

Second Semester

- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
 - 3 - PHYS 222 Physics with Calculus III
 - 1 - PHYS 224 Physics Lab. III
 - 4 - Emphasis Area²
 - 3 - Humanities Requirement E.2⁴
-
- 15

Junior Year

First Semester

- 3 - ECON 200 Economic Concepts
 - 3 - PTC 415 Intro. to Polymer Science and Engr.
 - 1 - PTC 417 Polymer and Fiber Lab.
 - 4 - TEXT 201 Yarn Structures and Formation
 - 3 - Emphasis Area²
 - 3 - Elective
-
- 17

Second Semester

- 3 - ENGL 314 Technical Writing
 - 3 - PTC 416 Chemical Preparation of Textiles
 - 4 - TEXT 202 Fabric Struc., Design, and Analysis
 - 3 - Emphasis Area²
 - 4 - Elective
-
- 17

Senior Year

First Semester

- 3 - PTC 457 Dyeing and Finishing I
 - 1 - PTC 459 Dyeing and Finishing Lab. I
 - 3 - TEXT 421 Fiber Science
 - 3 - TEXT 428 Textile Research
 - 7 - Approved Requirement⁵
-
- 17

Second Semester

- 3 - COMM 250 Public Speaking *or*
 - 3 - COMM 251 Business and Prof. Speaking
 - 3 - TEXT 422 Properties of Textile Structures
 - 4-5 - Approved Requirement⁵
 - 4-3 - Emphasis Area²
 - 3 - Elective
-
- 17

132 Total Semester Hours

¹HIST 101, 102, 172, or 173.

²Textile Chemistry—CH 223/227, 224/228, 331, 332, PTC 458/460

Textile and Fiber Science—PTC 303/305, 304/306, TEXT 403, 411, 414 or 416

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴See General Education Requirements.

⁵See advisor.

TEXTILE MANAGEMENT

Bachelor of Science

Freshman Year

First Semester

- 4 - CH 101 General Chemistry *or*
 - 4 - CH 105 Beg. Gen. and Organic Chemistry
 - 3 - ENGL 101 Composition I
 - 3 - MTHSC 102 Intro. to Mathematical Analysis
 - 3 - TEXT 175 Intro. to Textile Manufacturing
 - 3 - History Requirement¹
-
- 16

Second Semester

- 4 - CH 102 General Chemistry *or*
 - 4 - CH 106 Beg. Gen. and Organic Chemistry
 - 3 - CP SC 110 Elem. Computer Programming *or*
 - 3 - CP SC 120 Intro. to Info. Technology
 - 3 - ENGL 102 Composition II
 - 3 - MTHSC 207 Multivariable Calculus
 - 4 - TEXT 176 Natural and Man-made Fibers
-
- 17

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 3 - ECON 200 Economic Concepts
 - 3 - PSYCH 201 Introduction to Psychology
 - 4 - TEXT 201 Yarn Structures and Formation
 - 3 - Humanities Requirement E.2²
-
- 16

Second Semester

- 3 - ACCT 202 Managerial Accounting Concepts
 - 3 - COMM 250 Public Speaking *or*
 - 3 - COMM 251 Business and Prof. Speaking
 - 3 - MGT 301 Principles of Management
 - 4 - TEXT 202 Fabric Struc., Design, and Analysis
 - 3 - Literature Requirement³
-
- 16

Junior Year

First Semester

- 3 - FIN 306 Corporation Finance
 - 3 - LAW 322 Legal Environment of Business
 - 3 - MKT 301 Principles of Marketing
 - 4 - Concentration⁴
 - 3 - Emphasis Area⁵
-
- 16

Second Semester

- 3 - ENGL 314 Technical Writing
 - 3 - MGT 307 Personnel Management
 - 7 - Concentration⁴
 - 3 - Emphasis Area⁵
-
- 16

Senior Year

First Semester

- 3 - TEXT 324 Textile Statistics
 - 3 - TEXT 470 Text. Cost. and Inventory Control
 - 6-7 - Concentration⁴
 - 3 - Emphasis Area⁵
 - 3 - Elective
-
- 18-19

Second Semester

- 3 - MGT 415 Business Strategy
 - 4-3 - Concentration⁴
 - 3 - Emphasis Area⁵
 - 7 - Elective
-
- 17-16

132 Total Semester Hours

¹HIST 101, 102, 172, or 173.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴**Concentration**—For either Concentration, the listed 21 hours are required:

Chemical—PTC 303/305, 304/306, 405, 406, 416, 457/459.
Manufacturing—TEXT 308, 314, 403, 411, 422, 426, 429.

⁵**Emphasis Area**—A minimum of 12 credits must be selected with at least nine credits from any one of the following:

Computer Science—CP SC 210, 330, 360, 462, MGT 218.
Industrial Engineering—E G 209, MGT 402, 408.

Markets and Marketing—ECON 314, 412, MKT 302, 423, 424, 426, 431, 450, TEXT 472.

Personnel—ECON 301, 308, LAW 312, 313, MGT 400, 416.

Product Development and Merchandising—TEXT 333, 472, 475, MKT 302, 423, 425.

Science—MTHSC 106, 108, 206, 208, PHYS 122, 221, 222, 223, 224, PTC 303/305, 304/306.

Textile Specialties—TEXT 414, 416, 421, 471, 475, 476.

MINORS

Following are minors acceptable for students in the College of Engineering and Science. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting	Horse Production
Adult/Extension Education	Horticulture
Aerospace Studies	Human Resource Management
African American Studies	International Engineering and Science
Agricultural Business Management	International Politics
Agricultural Mechanization and Business	Legal Studies
Anthropology	Management
Athletic Leadership	Mathematical Sciences
Beef Cattle Production	Microbiology
Biochemistry	Military Leadership
Bioengineering	Modern Languages
Biological Sciences	Music
Business Administration	Natural Resource Economics
Chemistry	Operations Management
Cluster	Packaging Science
Communication Studies	Parks, Recreation, and Tourism Management
Communications	Philosophy
Computer Science— <i>not open to Computer Information Systems majors</i>	Physics
Crop and Soil Environmental Science	Plant Pathology
East Asian Studies	Political Science
Economics	Poultry Science
Education	Psychology
English	Public Policy
Entomology	Religion
Entrepreneurship	Science and Technology in Society
Environmental Engineering	Screenwriting
Environmental Science and Policy	Sociology
Film Studies	Spanish-American Area Studies
Financial Management	Textiles— <i>not open to Polymer and Textile Chemistry or Textile Management majors</i>
Fine Arts	Theatre
Food Science	Turfgrass
Forest Products	Urban Forestry
Forest Resource Management	Wildlife and Fisheries Biology
Geography	Women's Studies
Geology	Writing
Great Works	
Health Science	
History	

See pages 35–38 for details.

COLLEGE OF HEALTH, EDUCATION, AND HUMAN DEVELOPMENT

The College of Health, Education, and Human Development oversees academic programs offered by the School of Nursing; the School of Education; the Department of Public Health Sciences; the Department of Parks, Recreation, and Tourism Management; the Department of Family and Youth Development; the National Dropout Prevention Center; and the Joseph F. Sullivan Center for Nursing and Wellness. Preparation of professional leaders in the health, education, nursing, recreation, park management, and tourism services is the primary focus of the College. The educational resources of Clemson's other colleges are integrated into these curricular areas, providing students with the breadth as well as the depth to be successful professionals within their chosen fields.

SCHOOL OF EDUCATION

The mission of the School of Education is to prepare outstanding, reflective practitioners in education and human resource development through the provision of diverse experiences in content, method, and research that empower professionals to be effective members of the communities in which they live and serve. The School of Education trains teachers, counselors, and leaders for the K-12 schools and training and development specialists for business and industry.

TEACHER EDUCATION PROGRAMS

The School of Education embraces its conceptual framework of empowered professionals educating a diverse world. These professionals utilize the knowledge of curriculum, technology, assessment, and instructional/leadership/counseling strategies to effect learning for diverse populations. Clemson provides resources for courses and clinical experiences in method, research, and content knowledge which produce reflective practitioners who are knowledgeable, ethical, caring decision makers responding to local, state, and world needs.

The Teacher Education Programs prepare teachers, provide professional services to education in South Carolina, and carry out basic and applied research in education. Curricula are designed to provide a broad general education through liberal arts and science courses, develop depth of knowledge in the teaching area, gain an understanding of the historical, philosophical, and psychological backgrounds of American education, and acquire knowledge of and skill and experience in effective teaching techniques.

The Teacher Education Programs are accredited by the National Council for the Accreditation of Teacher Education (NCATE) for the preparation of educational personnel in South Carolina in Early Childhood, Elementary, and Special Education and secondary school programs in Agriculture, Biological Sciences, Earth Sciences, Economics, English, History, Mathematics, Modern Languages, Physical Sciences, Political Science, Psychology, Sociology, and Technology Education.

Admission

Professional—Application to the professional level of a program will be processed during the term in which a student is to complete 60 semester hours of work. At that time, the student will be notified of his/her status by the College's Academic Advising Center. Prior to admission, the student must have passed all areas of the Praxis I Pre-Professional Skills Test (PPST) and have a minimum cumulative grade-point ratio of 2.5.

Directed Teaching—A student shall apply to the field experience director prior to the semester in which directed teaching is to be scheduled. The following conditions must be met prior to registration for directed teaching: (1) admission to the professional level of a program; (2) completion of at least 95 semester hours; (3) a minimum cumulative grade-point ratio of 2.5.

Enrollment in Professional Courses

Enrollment in 400-level professional education courses is contingent upon admission to the professional level as described above. Any student who desires to enroll in education courses must meet the cumulative grade-point requirements established for education majors. A student who is denied admission may appeal to the Education Admissions Committee.

Graduation

To graduate, a student must have a score report for all state-mandated certification exams on file with the Academic Advising Center in the College of Health, Education, and Human Development. Students must pass all required Praxis II tests, excluding PLT (Principles of Learning and Teaching) before becoming a program completer and receiving recommendation for certification.

Graduate Study

Clemson University offers programs leading to the Master of Arts in Teaching, Master of Education, Master of Human Resource Development, Master of Industrial Education, Specialist in Education, Doctor of Education, and Doctor of Philosophy degrees.

AGRICULTURAL EDUCATION

Bachelor of Science

The College of Health, Education, and Human Development and the College of Agriculture, Forestry, and Life Sciences conduct a cooperative program to produce agricultural teachers (grades 9-12) for South Carolina. See page 40 for the curriculum.

EARLY CHILDHOOD EDUCATION

Bachelor of Arts

The Early Childhood Education curriculum prepares students for teaching positions on the pre-kindergarten and primary levels (Pre-K-3).

Freshman Year

First Semester

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 4 - MTHSC 117 Math. for Elem. School Tchrs. I
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²
- 2 - Elective

18

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 4 - MTHSC 118 Math. for Elem. School Tchrs. II
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

18

Sophomore Year

First Semester

- 3 - COMM 150 Intro. to Speech Comm. *or*
- 3 - COMM 250 Public Speaking
- 3 - ED EC 220 Family, School, and Comm. Rel.
- 3 - GEOG 103 Intro. to World Regional Geography
- 3 - Foreign Language Requirement¹
- 4 - Science Requirement²
- 2 - Elective

18

Second Semester

- 3 - ED F 301 Principles of American Education
- 3 - ED F 334 Child Growth and Development
- 3 - Foreign Language Requirement¹
- 3 - Humanities Requirement¹
- 3 - Literature Requirement¹
- 3 - Elective

18

Junior Year

First Semester

- 3 - ED EC 300 Found. of Early Childhood Educ.
- 3 - ED EC 336 Social Development of Infants and Young Children
- 3 - ED F 302 Educational Psychology
- 3 - ED SP 370 Introduction to Special Education
- 3 - THRD 310 Arts and Creativity for the Elementary Child
- 3 - Writing Intensive Requirement²

18

Second Semester

- 3 - ED EL 321 P. E. Meth. for Classroom Teachers
- 3 - ED EL 458 Health Education Methods for the Classroom Teacher
- 3 - ED F 480 (AG ED, THRD) Educational Applications of Microcomputers
- 3 - ED SP 468 Early Intervention for Infants and Children with Special Needs
- 3 - READ 458 Early Literacy
- 3 - Elective

18

Senior Year*(Courses must be taken as listed in both semesters.)***First Semester**

- 3 - ED EC 400 Observation and Assessment in Clinical Settings
- 3 - ED EC 420 Early Childhood Science
- 3 - ED EC 430 Early Childhood Mathematics
- 3 - ED EC 440 Integrated Language Arts and Social Studies in Primary Schools
- 3 - ED EC 450 Early Childhood Curriculum
- 3 - READ 459 Teaching Reading in the Early Grades: K-3

18

Second Semester

- 12 - ED EC 484 Dir. Teaching in Early Child. Ed.

12

138 Total Semester Hours

¹Two years of the same foreign language are required.²Three science courses (12 credit hours) composed of both biological and physical sciences are required. Eight of these hours must be a two-semester sequence. PH SC 107 and 108 and BIOL 109 are recommended.³A H 101, 210, MUSIC 210, THEA 210, 315, 316, or 317⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210⁵ENGL 304, 312, 314, 316, 333, 334, 345, or 346**ELEMENTARY EDUCATION****Bachelor of Arts**

The Elementary Education curriculum prepares students for teaching on the elementary school level (grades 1-8).

Freshman Year**First Semester**

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 4 - MTHSC 117 Math. for Elem. School Tchrs. I
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

16

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 118 Math. for Elem. School Tchrs. II
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

18

Sophomore Year**First Semester**

- 3 - HIST 173 Western Civilization
- 3 - Arts and Humanities Requirement¹
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement⁴
- 4 - Science Requirement²
- 1 - Elective

17

Second Semester

- 3 - COMM 150 Intro. to Speech Comm. or
- 3 - COMM 250 Public Speaking
- 3 - CP SC 120 Intro. to Info. Technology or
- 3 - ED F (AG ED, THRD) 480 Educational Applications of Microcomputers
- 3 - ED F 334 Child Growth and Development
- 3 - GEOG 101 Introduction to Geography or
- 3 - GEOG 103 World Regional Geography
- 3 - Arts and Humanities Requirement¹
- 3 - Foreign Language Requirement¹

18

Junior Year**First Semester**

- 3 - ED EL 321 P.E. Meth. for Classroom Teachers
- 3 - ED EL 458 Health Education Methods for the Classroom Teacher
- 3 - ED F 301 Principles of American Education
- 3 - ED F 302 Educational Psychology
- 3 - ENGL 385 Children's Literature
- 3 - Elective

18

Second Semester

- 3 - ED EL 452 Elem. Methods in Math. Teaching
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED SP 370 Introduction to Special Education
- 3 - READ 459 Teaching Reading in the Early Grades: K-3
- 3 - THRD 310 Arts and Creativity for the Elementary Child
- 6 - Elective

19

Senior Year*(Courses must be taken as listed in both semesters.)***First Semester**

- 3 - ED EL 401 Elementary Field Experience
- 3 - ED EL 451 Elem. Methods in Science Teaching
- 3 - ED EL 487 Teaching Social Studies in the Elementary School
- 3 - ED EL 488 Teaching the Language Arts in the Elementary School
- 3 - READ 460 Teaching Reading in the Intermediate Grades: 4-8

15

Second Semester

- 12 - ED EL 481 Dir. Teaching in the Elem. Sch.

12

133 Total Semester Hours

¹Two years of the same foreign language are required.²Three science courses (12 credit hours) composed of both biological and physical sciences are required. Eight of these hours must be a two-semester sequence. PH SC 107 and 108 and BIOL 109 are recommended.³HUM 301 and 302; or select three credits from two of the following fields:

Art—A H 210

Music—MUSIC 210, 311, 400

Theatre—THEA 210, 372

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.**MATHEMATICS TEACHING****Bachelor of Science**

The program leading to a Bachelor of Science degree in Mathematics Teaching is designed for students planning to teach mathematics on the secondary school level (grades 9-12).

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 4 - CH 105 Beg. General and Organic Chemistry
- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 4 - MTHSC 106 Calculus of One Variable I
- 2 - Elective

18

Second Semester

- 4 - BIOL 104 General Biology II
- 4 - CH 106 Beg. Gen. and Organic Chemistry
- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - Elective

18

Sophomore Year**First Semester**

- 3 - COMM 150 Introduction to Speech Comm. or
- 3 - COMM 250 Public Speaking
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 206 Calculus of Several Variables
- 4 - PHYS 207 General Physics I
- 3 - Literature Requirement¹

17

Second Semester

- 3 - ED F 302 Educational Psychology
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 311 Linear Algebra
- 3 - PHIL 102 Introduction to Logic
- 4 - PHYS 208 General Physics II

17

Junior Year**First Semester**

- 3 - ED F 301 Principles of American Education
- 3 - ENGL 314 Technical Writing
- 3 - MTHSC 301 Statistical Theory and Methods I
- 3 - MTHSC 308 College Geometry
- 3 - Humanities Requirement¹
- 2 - Elective

17

Second Semester

- 3 - ED F 335 Adolescent Growth and Development
- 3 - ED F (AG ED, THRD) 480 Educational Applications of Microcomputers
- 3 - ED SP 370 Introduction to Special Education
- 3 - EDSEC 437 Technology in Secondary Math.
- 3 - MTHSC 408 Topics in Geometry
- 3 - Mathematics Requirement¹

18

Senior Year

First Semester

- 3 - EDSEC 426 Teaching Secondary Mathematics⁴
- 3 - MTHSC 412 Introduction to Modern Algebra
- 3 - MTHSC 453 Advanced Calculus I
- 3 - READ 498 Secondary Content Area Reading⁵
- 3 - Mathematics Requirement¹

15

Second Semester

- 9 - EDSEC 446 Teaching Internship in Secondary Mathematics⁵
- 3 - EDSEC 456 Secondary Math. Capstone Sem.⁵
- 3 - Elective

15

135 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

²May be satisfied by completing A A H 210, HUM 301, 302, MUSIC 210, 311, or THEA 210.

³Any 200-400-level MTHSC course, except MTHSC 207, 210, 215, 216.

⁴EDSEC 426 and READ 498 must be taken concurrently. Offered fall semester only.

⁵EDSEC 446 and 456 must be taken concurrently. Offered spring semester only.

SCIENCE TEACHING

Bachelor of Science

The program leading to a Bachelor of Science degree in Science Teaching is designed for students planning to teach biological sciences, chemistry, earth sciences, or physical sciences on the secondary school level (grades 9-12). The required science electives are included to give some degree of competence in a field other than the major area. Students are urged to discuss the PRAXIS with their advisor upon completion of the sophomore year.

TEACHING AREA: BIOLOGICAL SCIENCES

Freshman Year

First Semester

- 4 - CH 101 General Chemistry
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I

17

Second Semester

- 4 - CH 102 General Chemistry
- 1 - ED 105 Orientation to Education
- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 301 Stat. Theory and Methods I or 4 - MTHSC 108 Calculus of One Variable II
- 3 - Elective

17-18

Sophomore Year

First Semester

- 5 - BIOL 110 Principles of Biology I
- 4 - CH 201 Survey of Organic Chemistry or 3 - CH 330 Intro. to Physical Chemistry
- 3 - ED F 301 Principles of American Education
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 4 - PHYS 207 General Physics I

16-17

Second Semester

- 5 - BIOL 111 Principles of Biology II
- 3 - COMM 150 Intro. to Speech Communication or 3 - COMM 250 Public Speaking
- 3 - ED F 302 Educational Psychology
- 4 - PHYS 208 General Physics II
- 3 - Literature Requirement¹

18

Junior Year

First Semester

- 3 - BIOCH 301 Molecular Biochemistry and
- 1 - BIOCH 302 Molecular Biochemistry Lab. or 3 - BIOCH 305 Essential Elements of Bioch. and 1 - BIOCH 306 Essential Elem. of Bioch. Lab.
- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - ED F 335 Adolescent Growth and Development
- 3 - GEN 302 Molecular and General Genetics and 1 - GEN 303 Introductory Genetics Lab.
- 4 - Elective

19

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - ENGL 314 Technical Writing
- 3 - HUM 301 or 302 Humanities
- 4 - Plant Diversity Requirement²
- 3 - Social Science Requirement³

17

Senior Year

First Semester

- 3 - EDSEC 427 Teaching Secondary Science⁴
- 3 - READ 498 Secondary Content Area Reading⁴
- 4 - Animal Diversity Requirement²
- 3-4 - Biology Requirement⁶
- 3 - Social Science Requirement¹
- 3 - Elective

19-20

Second Semester

- 3 - ED SP 370 Introduction to Special Education
- 9 - EDSEC 447 Teaching Internship in Sec. Sci.⁷
- 3 - EDSEC 457 Secondary Sci. Capstone Sem.⁷

15

138-141 Total Semester Hours

¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

²BIOSC 304/308 or 305/309.

³Select from courses in ANTH, ECON, GEOG, PO SC, PSYCH, SOC.

⁴To be taken semester immediately prior to student teaching.

⁵BIOSC 302/306 or 303/307.

⁶BIOSC 320, 335, 420, 470, or 491.

⁷EDSEC 447 and 457 must be taken concurrently. Offered spring semester only.

Note: This curriculum leads to South Carolina certification to teach all science subjects in grades 7-12 and provides clinical expertise for teaching middle school life science and/or high school biological sciences.

TEACHING AREA: EARTH SCIENCES

Freshman Year

First Semester

- 4 - CH 101 General Chemistry
- 3 - ENGL 101 Composition I
- 3 - GEOL 101 Physical Geology
- 1 - GEOL 103 Physical Geology Lab.
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I

18

Second Semester

- 4 - CH 102 General Chemistry
- 1 - ED 105 Orientation to Education
- 3 - ENGL 102 Composition II
- 4 - GEOL 102 Historical Geology
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 301 Stat. Theory and Methods I

18

Sophomore Year

First Semester

- 4 - BIOL 103 General Biology I
- 3 - ED F 301 Principles of American Education
- 1 - GEOL 100 Current Topics in Geology
- 4 - GEOL 306 Mineralogy
- 3 - Literature Requirement¹
- 3 - Social Science Requirement²

18

Second Semester

- 4 - BIOL 104 General Biology II
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ED F 302 Educational Psychology
- 4 - GEOL 302 Structural Geology
- 3 - PHYS 240 Physics of the Weather

17

Junior Year

First Semester

- 3 - ASTR 101 Solar System Astronomy
- 1 - ASTR 103 Solar System Astronomy Lab.
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED F 335 Adolescent Growth and Development
- 3 - ENGL 314 Technical Writing
- 4 - PHYS 207 General Physics I
- 4 - Elective

19

Second Semester

- 3 - ASTR 102 Stellar Astronomy
- 1 - ASTR 104 Stellar Astronomy Lab.
- 3 - COMM 150 Intro. to Speech Communication or 3 - COMM 250 Public Speaking
- 4 - PHYS 208 General Physics II
- 3 - Geology Requirement¹
- 3 - Elective

17

Senior Year**First Semester**

- 3 - EDSEC 427 Teaching Secondary Science⁴
- 3 - HUM 301 or 302 Humanities
- 3 - READ 498 Secondary Content Area Reading⁴
- 3-4 - Geology Requirement¹
- 3 - Social Science Requirement¹
- 3 - Elective

18-19

Second Semester

- 3 - ED SP 370 Introduction to Special Education
- 3 - EDSEC 447 Teaching Internship in Sec. Sci.⁴
- 3 - EDSEC 457 Secondary Sci. Capstone Sem.⁴

15

140-141 Total Semester Hours¹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.²Select from courses in ANTH, ECON, GEOG, PO SC, PSYCH, SOC.³Select from GEOL 302, 302, 314, 316, 318, 403, 405. (Each course may be taken only once.)⁴To be taken semester immediately prior to student teaching. Offered fall semester only.⁵EDSEC 447 and 457 must be taken concurrently. Offered spring semester only.⁶Note: This curriculum leads to South Carolina certification to teach all science subjects in grades 7-12 and provides special expertise for teaching middle and secondary earth and environmental sciences.**TEACHING AREA:
PHYSICAL SCIENCES****Freshman Year****First Semester**

- 4 - CH 101 General Chemistry
- 3 - CP SC 120 Intro. to Information Technology
- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I

17

Second Semester

- 4 - CH 102 General Chemistry
- 2 - CH 205 Introduction to Inorganic Chemistry
- 1 - ED 105 Orientation to Education
- 3 - ENGL 102 Composition II
- 3 - HIST 173 Western Civilization
- 4 - MTHSC 108 Calculus of One Variable II

17

Sophomore Year**First Semester**

- 4 - BIOL 103 General Biology I
- 3 - ED F 301 Principles of Organic Chemistry
- 3 - COMM 150 Intro. to Speech Communication or 3 - COMM 250 Public Speaking
- 3 - ED F 301 Principles of American Education
- 3 - MTHSC 301 Statistical Theory and Methods I
- 1 - PHYS 101 Current Topics in Modern Physics

18

Second Semester

- 4 - BIOL 104 General Biology II
- 3 - CH 330 Intro. to Physical Chemistry
- 3 - ED F 302 Educational Psychology
- 3 - PHYS 122 Physics with Calculus I
- 1 - PHYS 124 Physics Lab. I
- 3 - Social Science Requirement¹

17

Junior Year**First Semester**

- 3 - ED F 335 Adolescent Growth and Development
- 3 - HUM 301 or 302 Humanities
- 3 - PHYS 221 Physics with Calculus II
- 1 - PHYS 223 Physics Lab. II
- 3-4 - Astronomy Requirement¹
- 4 - Elective

17-18

Second Semester

- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ENGL 314 Technical Writing
- 3 - PHYS 222 Physics with Calculus III
- 1 - PHYS 224 Physics Lab. III
- 3 - PHYS 240 Physics of the Weather
- 3 - Literature Requirement¹
- 3 - Elective

17

Senior Year**First Semester**

- 3 - CH 313 Quantitative Analysis
- 1 - CH 317 Quantitative Analysis Lab.
- 3 - EDSEC 427 Teaching Secondary Science⁴
- 3 - READ 498 Secondary Content Area Reading⁴
- 2-4 - Physics Requirement⁵
- 3 - Social Science Requirement¹
- 3 - Elective

18-20

Second Semester

- 3 - ED SP 370 Introduction to Special Education
- 3 - EDSEC 447 Teaching Internship in Sec. Sci.⁶
- 3 - EDSEC 457 Secondary Sci. Capstone Sem.⁶

15

136-139 Total Semester Hours¹Select from courses in ANTH, ECON, GEOG, PO SC, PSYCH, SOC.²ASTR 101/103 or ASTR (GEOL) 220.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁴To be taken during the semester immediately prior to EDSEC 447 and 457. Offered fall semester only.⁵ASTR 302, 303, PHYS 290, 311, or 452.⁶EDSEC 447 and 457 must be taken concurrently. Offered spring semester only.⁷Note: This curriculum leads to South Carolina certification to teach all science subjects in grades 7-12 and provides special expertise for teaching secondary school chemistry, physics, and physical sciences.**SECONDARY EDUCATION****Bachelor of Arts**

The Bachelor of Arts degree in Secondary Education is available to students preparing to teach economics, English, geography, history, mathematics, modern languages (French, German, Spanish), political science, psychology, and sociology on the secondary school level (grades 9-12). The teaching field should be selected as early as possible so that appropriate freshman and sophomore courses may be taken.

Each curriculum requires a major concentration in the teaching field. Specific courses and sequences have been designated to meet requirements for those planning to teach. Students who have elective courses in the teaching area should consult their advisors prior to scheduling these courses.

The professional education courses should be completed in sequence. Application to Directed Teaching must be made in writing no later than May 1 preceding the school year in which student teaching is to be scheduled.

TEACHING AREA: ECONOMICS**Freshman Year****First Semester**

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 3 - HIST 101 History of the United States
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

18

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 102 History of the United States
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²
- 1 - Elective

18

Sophomore Year**First Semester**

- 3 - ECON 211 Principles of Microeconomics
- 3 - GEOG 101 Introduction to Geography
- 3 - HIST 172 Western Civilization
- 3 - PO SC 101 American National Government
- 3 - SOC 201 Introduction to Sociology
- 3 - Foreign Language Requirement¹

18

Second Semester

- 3 - ECON 212 Principles of Macroeconomics
- 3 - GEOG 103 World Regional Geography
- 3 - HIST 173 Western Civilization
- 3 - PSYCH 201 Introduction to Psychology
- 3 - Foreign Language Requirement¹
- 3 - Teaching Major³

18

Junior Year

First Semester

- 3 - COMM 150 Intro. to Speech Comm. *or*
- 3 - COMM 250 Public Speaking
- 3 - ED F 301 Principles of American Education
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED F 335 Adolescent Growth and Development
- 3 - ED SP 370 Introduction to Special Education
- 3 - Non-Western History Requirement⁴
- 2 - Elective

18

Second Semester

- 3 - ANTH 201 Introduction to Anthropology
- 3 - CP SC 120 Intro. to Information Technology *or*
- 3 - ED F (AG ED, THRD) 480 Educational Applications of Microcomputers
- 3 - ED F 302 Educational Psychology
- 3 - ENGL 312 Advanced Expository Writing
- 3 - Literature Requirement⁵
- 3 - Teaching Major¹

18

Senior Year

First Semester

- 3 - EDSEC 428 Teaching Secondary Social Studies⁶
- 3 - READ 498 Secondary Content Area Reading⁶
- 6 - Teaching Major¹
- 7 - Elective

19

Second Semester

- 9 - EDSEC 448 Teaching Internship in Social Studies
- 3 - EDSEC 458 Secondary Social Studies
- Capstone Seminar

12

139 Total Semester Hours

¹Two years of the same modern foreign language are required.

²See advisor. Select from General Education Requirements.

³Twelve credit hours to be selected from economics 300- and 400-level courses. Must be selected with consent of advisor.

⁴See advisor. HIST 394 is strongly recommended.

⁵ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁶EDSEC 428 and READ 498 must be taken concurrently in the semester preceding EDSEC 448. Offered fall semester only.

TEACHING AREA: ENGLISH

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability
- 3 - Computer Skills Requirement¹
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

17

Second Semester

- 1 - ED 105 Orientation to Education
- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement²
- 4 - Science Requirement³

18

Sophomore Year

First Semester

- 3 - COMM 150 Intro. to Speech Communication *or*
- 3 - COMM 250 Public Speaking
- 3 - ED F 301 Principles of American Education
- 3 - ENGL 202 Major Forms of Literature
- 3 - HIST 173 Western Civilization
- 3 - Foreign Language Requirement²
- 3 - Social Science Requirement³

18

Second Semester

- 3 - ED F 302 Educational Psychology
- 3 - ENGL 209 Contemporary Literature
- 3 - ENGL 353 Ethnic American Literature
- 3 - Foreign Language Requirement²
- 3 - Social Science Requirement³
- 3 - Elective

18

Junior Year

First Semester

- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED F 335 Adolescent Growth and Development
- 3 - HIST 365 English Cultural History
- 3 - HUM 301 or 302 Humanities⁴
- 6 - Teaching Major⁵

16

Second Semester

- 3 - ED SP 370 Introduction to Special Education
- 9 - Teaching Major⁵
- 4 - Elective

16

Senior Year

First Semester

- 3 - EDSEC 424 Teaching Secondary English⁶
- 3 - READ 498 Secondary Content Area Reading
- 9 - Teaching Major⁵
- 3 - Elective

18

Second Semester

- 9 - EDSEC 444 Teaching Internship in Sec. Engl.
- 3 - EDSEC 454 Secondary English Capstone Sem.

12

133 Total Semester Hours

¹See General Education Requirements.

²Two years of the same language are required.

³Select from courses in ANTH, ECON (including APEC 202), GEOG, PO SC, PSYCH, SOC.

⁴May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credit hours will be recorded as electives.

⁵ENGL 209, 353, and 24 credits of junior and senior English courses as follows: ENGL 386, 400, 401, 405 or 406; 411; 422, 423, 424 or 425; 435; 485.

⁶To be taken in the semester preceding Directed Teaching. Offered fall semester only.

TEACHING AREA: HISTORY

Freshman Year

First Semester

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 3 - HIST 101 History of the United States
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

18

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 102 History of the United States
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²
- 1 - Elective

18

Sophomore Year

First Semester

- 3 - ECON 211 Principles of Microeconomics
- 3 - GEOG 101 Introduction to Geography
- 3 - HIST 172 Western Civilization
- 3 - PO SC 101 American National Government
- 3 - SOC 201 Introduction to Sociology
- 3 - Foreign Language Requirement¹

18

Second Semester

- 3 - ECON 212 Principles of Macroeconomics
- 3 - GEOG 103 World Regional Geography
- 3 - HIST 173 Western Civilization
- 3 - PSYCH 201 Introduction to Psychology
- 3 - Foreign Language Requirement¹
- 3 - Teaching Major¹

18

Junior Year

First Semester

- 3 - COMM 150 Intro. to Speech Communication *or*
- 3 - COMM 250 Public Speaking
- 3 - ED F 301 Principles of American Education
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED F 335 Adolescent Growth and Development
- 3 - ED SP 370 Introduction to Special Education
- 3 - Non-Western History Requirement⁴
- 2 - Elective

18

Second Semester

- 3 - ANTH 201 Introduction to Anthropology
- 3 - CP SC 120 Intro. to Info. Technology *or*
- 3 - ED F (AG ED, THRD) 480 Educational Applications of Microcomputers
- 3 - ED F 302 Educational Psychology
- 3 - ENGL 312 Advanced Expository Writing
- 3 - Literature Requirement⁵
- 3 - Teaching Major¹

18

Senior Year**First Semester**

- 3 - EDSEC 428 Teaching Secondary Social Studies⁶
- 3 - READ 498 Secondary Content Area Reading⁶
- 6 - Teaching Major¹
- 7 - Elective

19

Second Semester

- 9 - EDSEC 448 Teaching Internship in Secondary Social Studies
- 3 - EDSEC 458 Secondary Social Studies Capstone Seminar

12

139 Total Semester Hours

¹Two years of the same modern foreign language are required.

⁶See advisor. Select from General Education Requirements.

⁷See advisor. Select from HIST 300, 301, 302, 303, 304, 305, 307, 312, 313, 316, 325, 330, 333, 338, 339, 340, 351, 352, 354, 355, 361, 363, 365, 370, 372, 373, 374, 375, 378, 391, 400, 418, 440, 450, 460, 470, 471, 493, 494. (HIST 113 is recommended for those planning to teach in South Carolina.)

⁸See advisor. HIST 394 is strongly recommended.

⁹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁶EDSEC 428 and READ 498 must be taken concurrently in the semester preceding EDSEC 448.

TEACHING AREA:**MATHEMATICS****Freshman Year****First Semester**

- 3 - ECON 200 Economic Concepts or
- 3 - ECON 211 Principles of Microeconomics
- 3 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 106 Calculus of One Variable I
- 4 - Foreign Language Requirement¹

18

Second Semester

- 3 - ENGL 102 Composition II
- 4 - MTHSC 108 Calculus of One Variable II
- 3 - MTHSC 129 Problem Solving in Discrete Math.
- 3 - Computer Skills Requirement²
- 4 - Foreign Language Requirement¹

1 - Elective

18

Sophomore Year**First Semester**

- 1 - EDF 315 (THRD) Integrating Computers into the Classroom
- 4 - MTHSC 206 Calculus of Several Variables
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement¹
- 4 - Science Requirement²

3 - Elective

18

Second Semester

- 3 - ED F 302 Educational Psychology
- 4 - MTHSC 208 Intro. to Ord. Diff. Equations
- 3 - MTHSC 311 Linear Algebra
- 3 - Foreign Language Requirement¹
- 4 - Science Requirement²

17

Junior Year**First Semester**

- 3 - COMM 250 Public Speaking
- 3 - ED F 301 Principles of American Education
- 3 - MTHSC 302 Statistics for Science and Engr.
- 3 - MTHSC 308 College Geometry
- 3 - Humanities Requirement⁴
- 3 - Social Science Requirement²

18

Second Semester

- 3 - ED F 335 Adolescent Growth and Development
- 3 - EDSEC 437 Technology in Secondary Mathematics
- 3 - ENGL 314 Technical Writing
- 3 - HIST 173 Western Civilization
- 3 - MTHSC 400 Theory of Probability
- 3 - MTHSC 408 Topics in Geometry

18

Senior Year**First Semester**

- 3 - ED SP 370 Introduction to Special Education
- 3 - EDSEC 426 Teaching Secondary Mathematics⁵
- 3 - MTHSC 412 Introduction to Modern Algebra
- 3 - MTHSC 453 Advanced Calculus I
- 3 - READ 498 Secondary Content Area Reading⁶
- 3 - Elective

18

Second Semester

- 9 - EDSEC 446 Teach. Internship in Sec. Math.⁶
- 3 - EDSEC 456 Secondary Math. Capstone Sem.⁶
- 3 - Elective

15

140 Total Semester Hours

¹Two years of the same language are required.

²Must be approved by Mathematical Sciences advisor.

⁹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁶A A H 210, HUM 301, 302, MUSIC 210, 311, or THEA 210.

⁶EDSEC 426 and READ 498 must be taken concurrently. Offered fall semester only.

⁶EDSEC 446 and 456 must be taken concurrently. Offered spring semester only.

TEACHING AREA:**MODERN LANGUAGES**

(French, German, and Spanish)

Freshman Year**First Semester**

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

15

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

17

Sophomore Year**First Semester**

- 3 - ED F 301 Principles of American Education
- 3 - HIST 173 Western Civilization
- 3 - Computer Skills Requirement²
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement¹
- 3 - Elective

18

Second Semester

- 3 - ED F 302 Educational Psychology
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement¹
- 3 - Social Science Requirement⁴
- 6 - Elective

18

Junior Year**First Semester**

- 3 - ED F 335 Adolescent Growth and Development
- 3 - ED SP 370 Introduction to Special Education
- 3 - Social Science Requirement⁴
- 9 - Teaching Major⁵

18

Second Semester

- 3 - COMM 150 Intro. to Speech Communication or
- 3 - COMM 250 Public Speaking
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 9 - Teaching Major⁵
- 3 - Writing Intensive Requirement⁷

16

Senior Year

(Directed Teaching—Either Semester)

First Semester

- 3 - EDSEC 425 Teaching Sec. Modern Languages⁸
- 3 - HUM 301 or 302 Humanities⁷
- 3 - READ 498 Secondary Content Area Reading⁶
- 6-9 - Teaching Major³

15-18

Second Semester

- 12 - EDSEC 412 Directed Student Teaching in Secondary School Subjects
- 3 - Elective

15

132-135 Total Semester Hours

¹Two years of the same language are required.

²See General Education Requirements.

⁹ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁶Select from courses in ANTH, ECON (including APEC 202), GEOG, PO SC, PSYCH, SOC.

⁸Requires 24 credits in French or German, or 27 credits in Spanish as listed.

French—FR 409 and 21 credits arranged as follows:

Group I—FR 300, 305, 307, 309.

Group II—Nine credits at the 400 level, including at least one 400-level literature course

German—GER 305, 411, and 18 credits arranged as follows:

Group I—12 credits from GER 301, 302, 308, 316, 412, 416.

Group II—Six credits from GER 401, 402, 403, 413.

Spanish—27 credits arranged as follows:

Group I—SPAN 303, 311

Group II—SPAN 307, 308

Group III—SPAN 309, 409, 411

Group IV—Six credits from SPAN 401, 403, 405, 406, 407, 418, 422, 435

*To be taken the semester prior to Directed Teaching.

May be satisfied by completing A A H 210 and MUSIC 210 or 311. In this case, the additional three credits will be recorded as electives.

TEACHING AREA: POLITICAL SCIENCE

Freshman Year

First Semester

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 3 - HIST 101 History of the United States
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

18

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 102 History of the United States
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²
- 1 - Elective

18

Sophomore Year

First Semester

- 3 - ECON 211 Principles of Microeconomics
- 3 - GEOG 101 Introduction to Geography
- 3 - HIST 172 Western Civilization
- 3 - PO SC 101 American National Government
- 3 - SOC 201 Introduction to Sociology
- 3 - Foreign Language Requirement¹

18

Second Semester

- 3 - ECON 212 Principles of Macroeconomics
- 3 - GEOG 103 World Regional Geography
- 3 - HIST 173 Western Civilization
- 3 - PSYCH 201 Introduction to Psychology
- 3 - Foreign Language Requirement¹
- 3 - Teaching Major³

18

Junior Year

First Semester

- 3 - COMM 150 Intro. to Speech Comm. or
3 - COMM 250 Public Speaking
- 3 - ED F 301 Principles of American Education
- 1 - ED F (THRD) 315 Integrating Computers
into the Classroom
- 3 - ED F 335 Adolescent Growth and Development
- 3 - ED SP 370 Introduction to Special Education
- 3 - Non-Western History Requirement⁴
- 2 - Elective

18

Second Semester

- 3 - ANTH 201 Introduction to Anthropology
- 3 - CPSC 120 Intro. to Information Technology or
3 - ED F (AG ED, THRD) 480 Educational
Applications of Microcomputers
- 3 - ED F 302 Educational Psychology
- 3 - READ 498 Secondary Content Area Reading⁶
- 3 - Literature Requirement⁵
- 3 - Teaching Major³

18

Senior Year

First Semester

- 3 - EDEEC 428 Teaching Secondary Social Studies⁶
- 3 - READ 498 Secondary Content Area Reading⁶
- 6 - Teaching Major³
- 7 - Elective

19

Second Semester

- 9 - EDEEC 448 Teach. Internship in Soc. Studies
- 3 - EDEEC 458 Sec. Soc. Studies Capstone Sem.

12

139 Total Semester Hours

¹Two years of the same modern foreign language are required.

²See advisor. Select from General Education Requirements.

³Twelve credit hours selected from 300- and 400-level courses in political science, with nine credits drawn from at least three of the following fields:

American Government—PO SC 403, 405, 432, 433, 442

Comparative Politics—PO SC 371, 471, 476, 477

International Relations—PO SC 361, 362, 363, 428

Political Theory—PO SC 450, 453

Public Policy and Administration—PO SC 302, 321

⁴See advisor. HIST 394 is strongly recommended.

⁵ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁶EDEEC 428 and READ 498 must be taken concurrently in the semester preceding EDEEC 448. Offered fall semester only.

TEACHING AREA: PSYCHOLOGY

Freshman Year

First Semester

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 3 - HIST 101 History of the United States
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

18

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 102 History of the United States
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²
- 1 - Elective

18

Sophomore Year

First Semester

- 3 - ECON 211 Principles of Microeconomics
- 3 - GEOG 101 Introduction to Geography
- 3 - HIST 172 Western Civilization
- 3 - PO SC 101 Introduction to American Politics
- 3 - SOC 201 Introduction to Sociology
- 3 - Foreign Language Requirement¹

18

Second Semester

- 3 - ECON 212 Principles of Macroeconomics
- 3 - GEOG 103 World Regional Geography
- 3 - HIST 173 Western Civilization
- 3 - PSYCH 201 Introduction to Psychology
- 3 - Foreign Language Requirement¹
- 3 - Teaching Major³

18

Junior Year

First Semester

- 3 - COMM 150 Intro. to Speech Comm. or
3 - COMM 250 Public Speaking
- 3 - ED F 301 Principles of American Education
- 1 - ED F (THRD) 315 Integrating Computers
into the Classroom
- 3 - ED F 335 Adolescent Growth and Development
- 3 - ED SP 370 Introduction to Special Education
- 3 - Non-Western History Requirement⁴
- 2 - Elective

18

Second Semester

- 3 - ANTH 201 Introduction to Anthropology
- 3 - CP SC 120 Intro. to Information Technology or
3 - ED F (AG ED, THRD) 480 Educational
Applications of Microcomputers
- 3 - ED F 302 Educational Psychology
- 3 - ENGL 312 Advanced Expository Writing
- 3 - Literature Requirement⁵
- 3 - Teaching Major³

18

Senior Year

First Semester

- 3 - EDEEC 428 Teaching Secondary Social Studies⁶
- 3 - READ 498 Secondary Content Area Reading
- 6 - Teaching Major³
- 7 - Elective

19

Second Semester

- 9 - EDEEC 448 Teaching Internship in Secondary
Social Studies
- 3 - EDEEC 458 Sec. Soc. Studies Capstone Sem.

12

139 Total Semester Hours

¹Two years of the same modern foreign language are required.

²See advisor. Select from General Education Requirements.

³Twelve credit hours to be selected from 300- and 400-level psychology courses. Must be selected with consent of advisor.

⁴See advisor. HIST 394 is strongly recommended.

⁵ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁶EDEEC 428 and READ 498 must be taken concurrently in the semester preceding EDEEC 448. Offered fall semester only.

TEACHING AREA: SOCIOLOGY**Freshman Year****First Semester**

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 3 - HIST 101 History of the United States
- 3 - MTHSC 101 Introduction to Probability
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

18

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 102 History of the United States
- 3 - MTHSC 102 Intro. to Mathematical Analysis
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

- 1 - Elective

18

Sophomore Year**First Semester**

- 3 - ECON 211 Principles of Microeconomics
- 3 - GEOG 101 Introduction to Geography
- 3 - HIST 172 Western Civilization
- 3 - PO SC 101 Introduction to American Politics
- 3 - SOC 201 Introduction to Sociology
- 3 - Foreign Language Requirement¹

18

Second Semester

- 3 - ECON 212 Principles of Macroeconomics
- 3 - GEOG 103 World Regional Geography
- 3 - HIST 173 Western Civilization
- 3 - PSYCH 201 Introduction to Psychology
- 3 - Foreign Language Requirement¹
- 3 - Teaching Major³

18

Junior Year**First Semester**

- 3 - COMM 150 Intro. to Speech Comm. or
- 3 - COMM 250 Public Speaking
- 3 - ED F 301 Principles of American Education
- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED F 335 Adolescent Growth and Development
- 3 - ED SP 370 Introduction to Special Education
- 3 - Non-Western History Requirement⁴
- 2 - Elective

18

Second Semester

- 3 - ANTH 201 Introduction to Anthropology
- 3 - CP SC 120 Intro. to Information Technology or
- 3 - ED F (AG ED, THRD) 480 Educational Applications of Microcomputers
- 3 - ED F 302 Educational Psychology
- 3 - ENGL 312 Advanced Expository Writing
- 3 - Literature Requirement⁵
- 3 - Teaching Major³

18

Senior Year**First Semester**

- 3 - EDSEC 428 Teaching Secondary Social Studies⁶
- 3 - READ 498 Secondary Content Area Reading⁷
- 6 - Teaching Major³
- 7 - Elective

19

Second Semester

- 9 - EDSEC 448 Teaching Internship in Secondary Social Studies
- 3 - EDSEC 458 Sec. Soc. Studies Capstone Sem.

12

139 Total Semester Hours¹Two years of the same modern foreign language are required.²See advisor. Select from General Education Requirements.³Twelve credit hours to be selected from 300- and 400-level sociology courses. Must be selected with consent of advisor.⁴See advisor. HIST 194 is strongly recommended.⁵ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁶EDSEC 428 and READ 498 must be taken concurrently in the semester preceding EDSEC 448. Offered fall semester only.**SPECIAL EDUCATION****Bachelor of Arts**

The Bachelor of Arts degree in Special Education prepares students to teach individuals with mild disabilities in grades K-12. The curriculum is designed to meet the competencies outlined by the Council for Exceptional Children for beginning special education teachers. Students completing the program receive instruction and practical experiences that lead to Generic Special Education Certification in South Carolina.

Freshman Year**First Semester**

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 4 - MTHSC 117 Math. for Elem. School Tchrs. I
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²
- 1 - Elective

17

Second Semester

- 3 - ENGL 102 Composition II
- 3 - HIST 172 Western Civilization
- 4 - MTHSC 118 Math. for Elem. School Tchrs. II
- 4 - Foreign Language Requirement¹
- 4 - Science Requirement²

18

Sophomore Year**First Semester**

- 1 - ED F (THRD) 315 Integrating Computers into the Classroom
- 3 - ED F 334 Child Growth and Development
- 3 - HIST 173 Western Civilization
- 3 - Foreign Language Requirement¹
- 3 - Literature Requirement³
- 4 - Science Requirement²

17

Second Semester

- 3 - COMM 150 Intro. to Speech Communication or
- 3 - COMM 250 Public Speaking
- 3 - ED F 302 Educational Psychology
- 3 - ED SP 370 Introduction to Special Education
- 3 - GEOG 101 Introduction to Geography
- 3 - Computer Skills Requirement⁴
- 3 - Foreign Language Requirement¹

18

Junior Year**First Semester**

- 3 - ED EL 458 Health Education Methods for the Classroom Teacher
- 3 - ED F 301 Principles of American Education for Individuals with Learning Disabilities⁵
- 3 - ED SP 373 Characteristics and Instruction of Individuals with Mental Retardation⁵
- 3 - READ 459 Teaching Reading in the Early Grades: K-3
- 3 - Elective

18

Second Semester

- 3 - ED EL 452 Elem. Methods in Math. Teaching
- 3 - ED EL 488 Teaching the Language Arts in the Elementary School
- 3 - ED SP 374 Char. and Strategies for Individuals with Emotional/Behavioral Disorders⁶
- 3 - ED SP 491 Educational Assessment of Individuals with Disabilities⁶
- 6 - Elective

18

Senior Year**First Semester**

- 3 - ED SP 492 Mathematics Instruction for Individuals with Mild Disabilities⁷
- 3 - ED SP 493 Classroom and Behavior Management for Special Educators⁷
- 3 - ED SP 494 Teaching Reading to Students with Mild Disabilities⁷
- 3 - ED SP 496 Special Education Field Experience⁷
- 3 - ED SP 497 Secondary Methods for Individuals with Disabilities⁷

15

Second Semester

- 3 - ED SP 495 Written Communication and Collaboration for the Resource Teacher
- 12 - ED SP 498 Directed Teaching in Special Ed.

15

136 Total Semester Hours¹Two years of the same foreign language are required.²Three science courses (12 credit hours) composed of both biological and physical sciences are required. Eight of these hours must be a two-semester sequence. PH SC 107 and 108 and BIOL 109 are recommended.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁴See General Education Requirements.⁵Must be taken during the fall semester of junior year.⁶Must be taken during the spring semester of junior year.⁷ED SP 492, 493, 494, 496, and 497 must be taken concurrently during the fall semester of senior year.

TECHNOLOGY AND HUMAN RESOURCE DEVELOPMENT

Bachelor of Science

The Bachelor of Science degree in Technology and Human Resource Development prepares students for professional teaching positions, as well as occupations in human resource development/industrial training in the private sector. To accomplish this, the curriculum is divided into four concentrations. By the end of the freshman year, each student must select one of the following concentrations: Customized Training and Development, Human Resource Development, Industrial Technology Education, or Vocational-Technical Education. Each curriculum requires 135 semester hours.

CUSTOMIZED TRAINING AND DEVELOPMENT CONCENTRATION

The Customized Training and Development concentration is specifically designed to facilitate the transfer of credit from approved associate degree programs into the Bachelor of Science degree in Technology and Human Resource Development. The curriculum builds upon the technical expertise gained in the associate programs to prepare individuals to become training specialists in business and industry. Students exit the program with skills related to analyzing needs; conducting job and task analyses; designing, marketing, and evaluating training programs; delivering professional presentations; and developing instructional materials.

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
 - 3 - Mathematical Sciences Requirement¹
 - 4 - Science Requirement¹
 - 3 - Technical Specialty Requirement²
 - 3 - Elective
-
- 16

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - Mathematical Sciences Requirement¹
 - 4 - Science Requirement¹
 - 3 - Technical Specialty Requirement²
 - 3 - Elective
-
- 16

Sophomore Year

First Semester

- 3 - Humanities Requirement E.1¹
 - 3 - Social Science Requirement¹
 - 6 - Technical Specialty Requirement²
 - 4 - Elective
-
- 16

Second Semester

- 3 - Computer Skills Requirement¹
 - 3 - Humanities Requirement E.2¹
 - 3 - Social Science Requirement¹
 - 3 - Technical Specialty Requirement²
-
- 15

Summer

- 6 - THRD 390 Industrial Cooperative Experience I

Junior Year

First Semester

- 3 - MGT 307 Personnel Management
 - 3 - THRD 360 Ind. Organizations and Safety
 - 3 - Major Requirement²
 - 3 - Oral Communication Requirement¹
 - 3 - Technical Specialty Requirement²
-
- 15

Second Semester

- 3 - PSYCH 364 Industrial Psychology *or*
 - 3 - PRMT 308 Lead. and Group Proc. in Rec.
 - 3 - THRD 160 Training Programs in Industry
 - 3 - Major Requirement²
 - 3 - Technical Specialty Requirement²
 - 3 - Writing Intensive Requirement¹
-
- 15

Summer

- 6 - THRD 490 Industrial Coop. Experience II

Senior Year

First Semester

- 3 - THRD 460 Dev. Training Programs for Ind.
 - 3 - THRD 468 Public Relations
 - 6 - Major Requirement²
 - 3 - Technical Specialty Requirement²
-
- 15

Second Semester

- 3 - MGT 400 Mgt. of Organizational Behavior *or*
 - 3 - MGT 416 Mgt. of Human Resources *or*
 - 3 - PSYCH 368 Organizational Psychology
 - 3 - THRD 465 Conducting and Evaluating Training Programs for Industry
 - 3 - THRD 486 Instructional Media Development
 - 3 - Major Requirement²
 - 3 - Technical Specialty Requirement²
-
- 15

135 Total Semester Hours

¹See General Education Requirements.

²See advisor.

HUMAN RESOURCE DEVELOPMENT CONCENTRATION

The Human Resource Development concentration prepares students to enter industry or business as training and development specialists. The curriculum provides participants with a broad exposure to industrial processes in manufacturing, construction, power/transportation, and communications. Numerous hands-on experiences related to the application of technology in industry are integrated with valuable skills and knowledge from the training and development profession. Students exit the program with skills related to analyzing needs; conducting job and task analyses; designing, marketing, and evaluating training programs; delivering professional presentations; and developing instructional materials.

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
 - 3 - THRD 110 Intro. to Industrial Technology
 - 3 - THRD 180 Introduction to Technical Drawing and Computer-Aided Drafting
 - 3 - Mathematical Sciences Requirement¹
 - 4 - Science Requirement¹
-
- 16

Second Semester

- 3 - ENGL 102 Composition II
 - 3 - THRD 160 Training Programs in Industry
 - 3 - THRD 181 Advanced Technical Drawing and Computer-Aided Drafting
 - 3 - Mathematical Sciences Requirement¹
 - 4 - Science Requirement¹
-
- 16

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 3 - CP-SC 120 Intro. to Information Technology
 - 3 - THRD 220 Manufacturing Tech. I: Systems
 - 3 - THRD 230 Construction Tech. I: Materials
 - 3 - Literature Requirement¹
-
- 15

Second Semester

- 3 - COMM 250 Public Speaking *or*
 - 3 - COMM 251 Business and Prof. Speaking
 - 3 - ECON 200 Economic Concepts *or*
 - 3 - ECON 211 Principles of Microeconomics
 - 3 - PSYCH 201 Introduction to Psychology
 - 3 - THRD 240 Power Technology I: Production
 - 3 - THRD 280 Comm. Tech. I: Processes and Mat.
 - 1 - Elective
-
- 16

Junior Year

First Semester

- 3 - ECON 301 Economics of Labor *or*
 - 3 - ECON 308 Collective Bargaining
 - 3 - MGT 301 Principles of Management
 - 3 - THRD 484 Comm. Technology II: Systems
 - 3 - Humanities Requirement E.2¹
 - 3 - Major Requirement⁴
 - 3 - Elective
-
- 18

Second Semester

- 3 - ENGL 314 Technical Writing
 - 3 - MGT 307 Personnel Management
 - 3 - THRD 360 Ind. Organizations and Safety
 - 3 - THRD 430 Const. Tech. II: Practices and Syst.
 - 3 - Major Requirement⁴
 - 3 - Elective
-
- 18

Senior Year

First Semester

- 3 - THRD 440 Power Technology II
 - 3 - THRD 460 Dev. Training Programs for Ind.
 - 3 - THRD 468 Public Relations
 - 3 - Communication Requirement³
 - 3 - Major Requirement⁴
 - 3 - Elective
-
- 18

Second Semester

- 3 - MGT 416 Mgt. of Human Resources *or*
- 3 - MGT 400 Mgt. of Organizational Behavior *or*
- 3 - PSYCH 368 Organizational Psychology
- 3 - PSYCH 364 Industrial Psychology *or*
- 3 - PSYCH 454 Psych. of Human Relation. *or*
- 3 - PRMT 308 Lead. and Group Proc. in Rec.
- 3 - THRD 240 Manuf. Tech. II: Mat. and Proc.
- 3 - THRD 465 Conducting and Evaluating Training Programs for Industry
- 3 - THRD 486 Instructional Media Development
- 3 - Major Requirement⁴

18

135 Total Semester Hours¹See General Education Requirements.²ENGL 202, 203, 204, 205, 206, 207, 208, 209, *or* H210.³COMM 402, PHIL 324, *or* 344.⁴See advisor, two technical courses must be represented.⁵COMM 350, 360, 361, 364, 367, *or* ENGL 304.

Note: One summer (400 clock hours) of field experience is required following the sophomore year.

INDUSTRIAL TECHNOLOGY EDUCATION CONCENTRATION

The Industrial Technology Education Concentration is designed for students who plan to teach industrial technology in the secondary schools (grades 6–12). Industrial technology is the subject area in the public school system which provides youth with an interpretation of American industry. It is a general education subject designed to give students exploratory experience in the classroom and laboratory. Majors in this concentration are qualified to seek certification as secondary school teachers of industrial technology.

Freshman Year**First Semester**

- 1 - ED 105 Orientation to Education
- 3 - ENGL 101 Composition I
- 3 - THRD 110 Intro. to Industrial Technology
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement²
- 2 - Elective

16

Second Semester

- 3 - ENGL 102 Composition II
- 3 - THRD 180 Introduction to Technical Drawing and Computer-Aided Drafting
- 3 - Computer Skills Requirement¹
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement²
- 2 - Elective

18

Sophomore Year**First Semester**

- 3 - HIST 173 Western Civilization
- 3 - THRD 220 Manufacturing Tech. I: Systems
- 3 - THRD 230 Construction Tech. I: Materials
- 3 - Literature Requirement¹
- 4 - Science Requirement²
- 1 - Elective

17

Second Semester

- 3 - COMM 250 Public Speaking
- 3 - MUSIC 210 Music Appreciation: Music in the Western World
- 3 - THRD 181 Advanced Technical Drawing and Computer-Aided Drafting
- 3 - THRD 240 Power Technology I: Production
- 3 - THRD 280 Comm. Tech. I: Processes and Mat.
- 3 - Social Science Requirement¹

18

Junior Year**First Semester**

- 3 - ED EL 458 Health Education Methods for the Classroom Teacher
- 3 - ED F 302 Educational Psychology
- 3 - THRD 440 Power Technology II
- 3 - THRD 484 Comm. Tech. II: Systems
- 3 - Writing Intensive Requirement¹
- 2 - Elective

17

Second Semester

- 3 - A A H 210 Intro. to Art and Architecture
- 3 - ED F 335 Adolescent Growth and Development
- 3 - THRD 415 History and Philosophy of Industrial and Vocational Education *or*
- 3 - ED F 301 Prin. of American Education
- 3 - THRD 420 Manuf. Tech. II: Mat. and Proc.
- 3 - THRD 430 Const. Tech. II: Practices and Syst.
- 3 - Major Requirement⁴

18

Senior Year**First Semester**

- 3 - ED SP 370 Introduction to Special Education
- 3 - THRD 470 Course Organization and Eval.
- 3 - THRD 471 Teaching Industrial Subjects
- 3 - Major Requirement¹
- 4 - Elective

16

Second Semester

- 3 - THRD 371 Mgt. of Industrial Education Labs.
- 12 - THRD 477 Directed Teaching

15

135 Total Semester Hours¹See General Education Requirements.²Both biological and physical laboratory sciences must be represented with an eight-credit sequence in one.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, *or* H210.⁴Select from G C 207, 215, TEXT 333, 460, THRD 224, 250, 450, (AG ED), ED F 480, (AG ED), ED F 482, 483.

VOCATIONAL-TECHNICAL EDUCATION CONCENTRATION

The Vocational-Technical Education concentration prepares teachers of vocational and technical subjects in senior high schools, career centers, and technical education centers. Teachers graduating from this concentration possess the skills and knowledge required to teach the occupation or family of occupations in their area of specialization.

Freshman Year**First Semester**

- 3 - ENGL 101 Composition I
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement²
- 3 - Technical Specialty Requirement³
- 3 - Elective

16

Second Semester

- 3 - ENGL 102 Composition II
- 3 - Mathematical Sciences Requirement¹
- 4 - Science Requirement²
- 3 - Technical Specialty Requirement³
- 3 - Elective

16

Sophomore Year**First Semester**

- 3 - Humanities Requirement E.1¹
- 3 - Social Science Requirement¹
- 6 - Technical Specialty Requirement²
- 4 - Elective

16

Second Semester

- 3 - Computer Skills Requirement¹
- 3 - Humanities Requirement E.2¹
- 3 - Social Science Requirement¹
- 6 - Technical Specialty Requirement²

15

Summer

- 6 - THRD 390 Industrial Cooperative Experience I

Junior Year**First Semester**

- 3 - COMM 250 Public Speaking
- 3 - THRD 370 Motivation and Discipline in Vocational Education
- 3 - Approved Requirement¹
- 6 - Technical Specialty Requirement²

15

Second Semester

- 3 - THRD 371 Mgt. of Industrial Education Labs.
- 3 - Approved Requirement¹
- 6 - Technical Specialty Requirement²
- 3 - Writing Intensive Requirement¹

15

Summer

- 6 - THRD 490 Industrial Coop. Experience II

Senior Year**First Semester**

- 3 - THRD 470 Course Organization and Eval.
- 3 - THRD 471 Teaching Industrial Subjects
- 3 - THRD 472 Advanced Instructional Methods
- 6 - THRD 478 Internship in Voc. Tech. Ed. I

15**Second Semester**

- 3 - THRD 415 History and Philosophy of Industrial and Vocational Education or
- 3 - EDF 301 Prin. of American Education
- 3 - THRD 473 Competency Test. in Voc. Subjects
- 6 - THRD 479 Internship in Voc. Technical Ed. II
- 3 - THRD (AG ED, ED F) 480 Educational Applications of Microcomputers

15

135 Total Semester Hours

¹See General Education Requirements.²See advisor. Technical specialties must relate to one of the Trades and Industries programs recognized by the South Carolina Department of Education.³See advisor.**HEALTH SCIENCE****Bachelor of Science**

The Department of Public Health Sciences prepares students for careers in the health field, one of the largest industries in the United States. It includes hospitals and other medical service providers, public health organizations, health insurance companies, health/medical related sales, and community and non-profit health agencies.

Plans of study can be arranged in health promotion and education and preprofessional health studies. Students in Health Promotion and Education have the skills to assess, plan, communicate, implement, manage, and evaluate public health promotion programs. Students in the Preprofessional Health Studies Concentration obtain the coursework and experience necessary for acceptance into various graduate programs in clinical health professions.

Students enrolled in HLTH 402 must have proof of CPR Certification prior to registration.

HEALTH PROMOTION AND EDUCATION CONCENTRATION**Freshman Year****First Semester**

- 4 - BIOL 103 General Biology I
- 3 - ENGL 101 Composition I
- 3 - HLTH 202 Introduction to Public Health
- 4 - Chemistry Requirement¹
- 3 - Computer Skills Requirement¹

17**Second Semester**

- 3 - ENGL 102 Composition II
- 4 - Chemistry Requirement¹
- 3-4 - Mathematical Sciences Requirement¹
- 3 - Social Science Requirement²
- 3 - Social Science Requirement⁴

16-17**Sophomore Year****First Semester**

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - HLTH 298 Human Health and Disease
- 3 - PSYCH 201 Introduction to Psychology
- 3 - Philosophy Requirement³
- 4 - Elective

17**Second Semester**

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - ENGL 304 Business Writing or
- 3 - ENGL 314 Technical Writing
- 3 - HLTH 240 Determinants of Health Behavior
- 3 - Social Science Requirement⁴
- 3 - Statistics Requirement⁶

16**Junior Year****First Semester**

- 3 - HLTH 303 Communication in Health Systems
- 3 - HLTH 340 Health Promotion and Education
- 3 - HLTH 380 Epidemiology
- 1 - HLTH 398 Health Appraisal Skills
- 1 - HLTH 419 Hlth. Sci. Internship Prep. Seminar
- 3 - NUTR 203 Principles of Human Nutrition
- 3 - Health Requirement¹

17**Second Semester**

- 3 - HLTH 315 Social Epidemiology
- 3 - HLTH 402 Principles of Health Fitness
- 3 - HLTH 490 Res. and Eval. Strat. for Pub. Hlth.
- 3 - PSYCH 340 Lifespan Developmental Psych.
- 3 - Oral Communication Requirement²
- 3 - Social Science Requirement⁴

18**Summer**

- 4 - HLTH 420 Health Science Internship⁷

Senior Year**First Semester**

- 3 - HLTH 440 Managing Health Service Org.
- 3 - HLTH 480 Community Health Promotion
- 3 - HLTH 498 Improving Population Health
- 3 - Cultural and Family Context Requirement⁸
- 3 - Health Requirement¹

15**Second Semester**

- 3 - HLTH 450 Applied Health Strategies
- 3 - Concentration Area Requirement¹
- 3 - Humanities Requirement E.I.²
- 6 - Elective

15

135-136 Total Semester Hours

¹See advisor.²See General Education Requirements.³MTWSC 101, 102, or 106.⁴Select from ANTH 201, 301, 351, R S 301, (SOC) 459, SOC 201, 311.⁵Select from PHIL course at 200 level or higher from General Education list.⁶EX ST 301, MTWSC 203, or 301.⁷Internship must be completed in one or two semesters. In-

ternship may be done in fall, spring, or summer after completing HLTH 419. Prior approval is required for summer internships. 2.0 grade-point ratio required for registration.

⁸ANTH 201, 301, 351, SOC 201, 311, 460, or 480.

Note: A minimum grade-point ratio of 2.0 is required for registration in each HLTH course.

PREPROFESSIONAL HEALTH STUDIES CONCENTRATION**Freshman Year****First Semester**

- 4 - BIOL 103 General Biology I or
- 5 - BIOL 110 Principles of Biology I
- 4 - CH 101 General Chemistry I
- 3 - ENGL 101 Composition I
- 3 - HLTH 202 Introduction to Public Health
- 3 - Computer Skills Requirement¹

17-18**Second Semester**

- 4 - BIOL 104 General Biology II or
- 5 - BIOL 111 Principles of Biology II
- 4 - CH 102 General Chemistry II
- 3 - ENGL 102 Composition II
- 3 - Social Science Requirement¹
- 3 - Mathematical Sciences Requirement²

17-18**Sophomore Year****First Semester**

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - HLTH 298 Human Health and Disease
- 4 - Concentration Area Requirement³
- 3 - Philosophy Requirement⁴
- 3 - Statistics Requirement⁵

17**Second Semester**

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - ENGL 304 Business Writing or
- 3 - ENGL 314 Technical Writing
- 3 - HLTH 240 Determinants of Health Behavior
- 4 - Concentration Area Requirement¹
- 3 - Social Science Requirement¹

17**Junior Year****First Semester**

- 3 - HLTH 303 Communication in Health Systems
- 3 - HLTH 340 Health Promotion and Education
- 3 - HLTH 380 Epidemiology
- 1 - HLTH 419 Hlth. Sci. Internship Prep. Seminar
- 4 - PHYS 207 General Physics I
- 3 - Concentration Area Requirement¹

17**Second Semester**

- 3 - HLTH 315 Social Epidemiology
- 3 - HLTH 490 Res. and Eval. Strat. for Pub. Hlth.
- 4 - PHYS 208 General Physics II
- 3 - Concentration Area Requirement¹
- 3 - Oral Communication Requirement¹

16**Summer**

- 4 - HLTH 420 Health Science Internship⁶

Senior Year

First Semester

- 3 - HLTH 440 Managing Health Service Org.
- 3 - HLTH 498 Improving Population Health
- 3 - Concentration Area Requirement¹
- 3 - Cultural and Family Context Requirement²
- 4 - Elective

16

Second Semester

- 3 - Concentration Area Requirement²
- 3 - Humanities Requirement E.1¹
- 6 - Elective

12

133-135 Total Semester Hours

¹See General Education Requirements.²See advisor.

CH 223/224 is required for Pre-Med and Pre-Dental students. BIOCH 301 is strongly recommended for Pre-Med students. See advisor for a list of recommended courses.

¹Any PHIL course at 200 level or higher selected from General Education E.2 list.

²EX ST 301, MTHSC 203, or 301.

³Internship must be completed in one or two semesters. Internship may be done fall, spring, or summer after completing HLTH 419. Prior approval is required for summer internships. 2.0 grade-point ratio required for registration.

⁴ANTH 201, 301, 351, GEOG 103, 330, 340, 360, SOC 201, 311, 460, or 480.

LANGUAGE AND INTERNATIONAL HEALTH

Bachelor of Science

The Language and International Health program is administered by the College of Architecture, Arts, and Humanities and the College of Health, Education, and Human Development. See page 59 for the curriculum.

NURSING

Bachelor of Science

The Bachelor of Science degree program in Nursing prepares students for professional nursing practice in a variety of settings, such as hospitals, industry, clinics, and public health agencies. During the first two years, emphasis is on liberal arts and basic science courses arranged to provide a foundation for the nursing major. Junior and senior courses emphasize the study of nursing. Clinical nursing experiences, guided by the Nursing faculty, involve acute and community-based settings. Students are responsible for their own transportation to clinical laboratory experiences, which may extend throughout the Upstate.

Entrance Requirements

To facilitate admission of students who can achieve at an appropriate level in the program, admission is selective. Consideration is given to performance in secondary school and on the College Board Examination (SAT). Those seeking admission are advised to apply to the University early in the fall of the senior year in high school.

When space is available, a student may change majors into the School of Nursing with a 2.75 cumulative grade-point ratio.

Nursing majors are required to carry, throughout the clinical laboratory period, current and valid student nurses' professional liability insurance with minimum limits of liability of \$1,000,000 per occurrence and \$3,000,000 in aggregate. Documentation of such coverage must be provided to the Director of the School of Nursing. No student may participate in clinical learning activities without this insurance coverage.

To comply with clinical agency contract requirements and South Carolina law, students enrolled in nursing courses with a clinical laboratory must meet specific requirements listed in the *School of Nursing Student Handbook*.

The School of Nursing programs are accredited by the National League for Nursing Accrediting Commission, 350 Hudson St., New York, NY 10014; telephone (212) 989-9393, extension 451/153.

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I
- 4 - CH 101 General Chemistry I
- 3 - ENGL 101 Composition I
- 3 - PSYCH 201 Introduction to Psychology
- 3 - SOC 201 Introduction to Sociology

17

Second Semester

- 4 - CH 102 General Chemistry II
- 3 - ENGL 102 Composition II
- 3 - MTHSC 101 Introduction to Probability
- 3 - NUTR 203 Principles of Human Nutrition
- 3 - Computer Skills Requirement¹

16

Sophomore Year

First Semester

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - EX ST 301 Introductory Statistics or
- 3 - MTHSC 203 Elem. Statistical Inference
- 4 - MICRO 205 Introductory Microbiology
- 3 - Humanities Requirement E.1¹
- 3 - Elective

17

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - Humanities Requirement E.2²
- 7 - Elective

14

Junior Year

First Semester

- 3 - NURS 304 Pathophys. for Health-Care Prof.
- 3 - NURS 310 Health Assessment
- 4 - NURS 312 Therapeutic Nursing Interventions
- 2 - NURS 320 Professionalism in Nursing
- 3 - NURS 340 Pharmacotherapeutic Nursing Interventions

15

Second Semester

- 7 - NURS 303 Nursing of Adults
- 3 - NURS 305 Psychosocial Nursing
- 2 - NURS 311 Intro. to Community Nursing
- 2 - NURS 323 Gerontology Nursing
- 3 - NURS 330 Research in Nursing

17

Senior Year

First Semester

- 5 - NURS 401 Mental Health Nursing
- 5 - NURS 411 Nursing Care of Children
- 5 - NURS 412 Nurs. Care of Women and Families
- 3 - Oral Communication Requirement

18

Second Semester

- 5 - NURS 403 Complex Nursing of Adults
- 3 - NURS 405 Leadership and Mgt. in Nursing
- 3 - NURS 408 Senior Nursing Practicum
- 4 - NURS 415 Community Health Nursing

15

129 Total Semester Hours

¹See General Education Requirements.

Notes:

1. A minimum grade-point ratio of 2.5 is required in all courses for progression to junior year nursing courses.
2. A minimum grade-point ratio of 2.5 must be achieved in all required nursing courses for progression to the next level. Students may repeat a nursing course one time only.
3. Students must pass didactic and clinical component to pass all clinical courses.
4. A minimum grade-point ratio of 2.5 is required for registration in each nursing course.

Registered Nurse BS Completion Program

The RN/BS curriculum offers an individualized study option for the registered nurse to obtain a baccalaureate degree in Nursing. Credits may be earned through an accelerated program of study, combining transfer credits for selected courses from accredited institutions of higher learning, credit by examination for previously completed nursing courses, and enrollment in courses at Clemson University. Qualified students may take up to six hours of graduate courses towards the master's degree in nursing. Registered nurses interested in pursuing a baccalaureate degree should contact the School of Nursing for curriculum requirements.

Freshman Year

First Semester

- 3 - ENGL 101 Composition I
- 3 - PSYCH 201 Introduction to Psychology
- 3 - Computer Skills Requirement¹
- 8 - Science Requirement²

17

Second Semester

- 3 - ENGL 102 Composition II
- 4 - MICRO 205 Introductory Microbiology
- 3 - NUTR 203 Principles of Human Nutrition
- 3 - SOC 201 Introduction to Sociology
- 4 - Science Requirement¹

17

Sophomore Year

First Semester

- 4 - BIOSC 222 Human Anatomy and Phys. I
- 3 - MTHSC 101 Introduction to Probability
- 6 - Humanities Requirement E.1 and E.2²
- 3 - Elective

16

Second Semester

- 4 - BIOSC 223 Human Anatomy and Phys. II
- 3 - EX ST 301 Introductory Statistics *or*
- 3 - MTHSC 203 Elem. Statistical Inference
- 3 - Oral Communication Requirement²
- 4 - Elective

Junior Year

First Semester

- 7 - NURS 303 Nursing of Adults³
- 4 - NURS 312 Therapeutic Nurs. Interventions⁴
- 5 - NURS 401 Mental Health Nursing⁴
- 5 - NURS 411 Nursing Care of Children³

Second Semester

- 3 - NURS 304 Pathophys. for Health-Care Prof.
- 5 - NURS 307 Family Nursing in the Community
- 4 - NURS 313 Health Assess. Through Lifespan
- 3 - NURS 330 Research in Nursing

Senior Year

First Semester

- 5 - NURS 403 Complex Nursing of Adults³
- 3 - NURS 406 Issues in Professionalism
- 5 - NURS 412 Nurs. Care of Women and Fam.⁴

Second Semester

- 3 - NURS 405 Leadership and Mgt. in Nursing
- 4 - NURS 415 Community Health Nursing
- 6 - Departmental Requirement³
- 3 - Elective

129 Total Semester Hours

¹Students are expected to transfer all courses listed in the freshman and sophomore years.

²See General Education Requirements.

³Twelve hours selected from BIOL 103, 104; CH 101, 102. Biology and chemistry must be represented; two of the courses must be in a sequence.

⁴Students are expected to receive credit by examination.

⁵See advisor.

Notes:

All courses used to fulfill the support course requirements must be approved by the School of Nursing.

2. A minimum grade of C must be achieved in all nursing courses for progression to the next level. Students may repeat a nursing course one time only.

3. Seniors must have a cumulative grade-point ratio of 3.0 or higher on all college courses attempted to be eligible to enroll in courses numbered 800 or above (subject to approval of form GS6). See advisor for details.

4. To qualify for an undergraduate degree, a student must complete 37 of the last 43 credits at Clemson.

PARKS, RECREATION, AND TOURISM MANAGEMENT

Bachelor of Science

The Department of Parks, Recreation, and Tourism Management prepares students for a variety of careers in public and private leisure services. The undergraduate curriculum provides a broad exposure to the social, physical, and biological sciences required to manage leisure service programs and resources, such as those for municipalities, institutions, voluntary and youth-serving agencies, management positions within the travel and tourism industry and as resource managers of local, state, and federal parks and related lands and waters.

The flexible curriculum allows students to select from six concentrations. This latitude permits accommodation of each student's career objectives in positions in community recreation, sport management, recreation, cultural arts management, commercial recreation, wilderness management, nature interpretation, park management, historic site management, rehabilitation services, leisure counseling, camp administration, recreation therapy, programs for people with disabilities or senior citizens, travel industry, resort management, convention and visitor bureaus, theme parks, community tourism, and special event/festival planning, to name a few.

The Parks, Recreation, and Tourism Management program is accredited by the National Council on Accreditation (National Recreation and Park Association/Council on Postsecondary Accreditation). Graduates are immediately eligible to apply to become "Certified Park and Recreation Professionals," a valuable credential for professional advancement.

When space is available, a student may change majors to one of the degree concentrations in the Department of Parks, Recreation and Tourism Management with a 2.0 cumulative grade-point ratio, at least 30 credit hours earned, and approval of the department chair or his/her designee.

The Department of Parks, Recreation, and Tourism Management is a South Carolina Commission on Higher Education "Commendation for Excellence" recipient and a top-ranked program nationally.

Graduate degrees offered are Master of Parks, Recreation, and Tourism Management; Master of Science; and Doctor of Philosophy.

COMMUNITY RECREATION MANAGEMENT

Freshman Year

First Semester

- 4 - BIOL 101 Concepts in Biology I¹ *or*
- 3 - GEOL 101 Physical Geology¹ *and*
- 1 - GEOL 103 Physical Geology Lab.¹
- 3 - ENGL 101 Composition I
- 3 - PRMT 101 Concepts of Leisure
- 3 - PRMT (FOR) 209 Professional Application of Microcomputers²
- 3 - Mathematical Sciences Requirement³

16

Second Semester

- 4 - BIOL 102 Concepts in Biology II¹ *or*
- 3 - GEOL 112 Earth Resources¹ *and*
- 1 - GEOL 114 Earth Resources Lab.¹
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics
- 3 - PRMT 205 Program and Event Planning
- 3 - Elective

16

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - PRMT 201 Recreation/Leisure Environment
- 1 - PRMT 206 Practicum I
- 3 - PSYCH 201 Introduction to Psychology *or*
- 3 - SOC 201 Introduction to Sociology
- 3 - Literature Requirement⁴
- 3 - Elective

16

Second Semester

- 3 - COMM 250 Public Speaking *or*
- 3 - COMM 251 Business and Prof. Speaking
- 3 - ECON 211 Principles of Microeconomics *or*
- 3 - ECON 212 Principles of Macroeconomics
- 1 - PRMT 207 Practicum II
- 3 - PRMT 308 Leadership and Group Proc. in Rec.
- 3 - Humanities Requirement E.2¹
- 3 - Elective

16

Junior Year

First Semester

- 3 - LAW 322 Legal Environment of Business
- 3 - MKT 301 Principles of Marketing
- 3 - PRMT 307 Facility Planning and Operations
- 3 - PRMT 321 Recreation Administration
- 1 - PRMT 404 Field Training I
- 3 - Writing Intensive Requirement⁵

16

Second Semester

- 3 - MGT 307 Personnel Management *or*
- 3 - POS SC 427 Public Management
- 3 - PRMT 254 Introduction to Sport Management
- 3 - PRMT 305 Safety and Risk Mgt. in PRMT
- 6 - Approved Requirement⁶

15

Summer

- 6 - PRMT 405 Field Training II

Senior Year

First Semester

- 3 - PRMT 403 Elements of Recreation and Park Planning
- 3 - PRMT 409 Methods of Recreation Research I
- 3 - PRMT 441 Commercial Recreation *or*
- 3 - PRMT 317 Group Initiatives
- 3 - PRMT 446 Community Tourism Development
- 6 - Approved Requirement⁶

18

Second Semester

- 3 - PRTM 309 Behavioral Concepts in PRTM
- 3 - PRTM 421 Rec. Financial Resources Mgt.
- 6 - Approved Requirement^a
- 4 - Elective

16

135 Total Semester Hours^aEight hour sequence in the same science.

Other General Education Computer Skills courses may be substituted.

^cSee General Education Requirements.^eENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.^fENGL 304 or 314 is recommended.

Eighteen credit hours in a related minor or 300-400-level courses in a focused program developed with and approved by the advisor.

PARK AND PROTECTED AREA MANAGEMENT CONCENTRATION

Freshman Year**First Semester**

- 4 - BIOL 101 Concepts in Biology I
- 3 - ENGL 101 Composition I
- 3 - PRTM 101 Concepts of Leisure
- 3 - PRTM (FOR) 209 Professional Application of Microcomputers^f
- 3 - Mathematical Sciences Requirement^c

16

Second Semester

- 4 - BIOL 102 Concepts in Biology II
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics
- 3 - PRTM 205 Program and Event Planning
- 3 - Elective

16

Sophomore Year**First Semester**

- 3 - PRTM 201 Recreation/Leisure Environment
- 1 - PRTM 206 Practicum I
- 3 - PRTM 270 Intro. to Recreation Resources Mgt.
- 3 - PSYCH 201 Introduction to Psychology or
3 - SOC 201 Introduction to Sociology
- 3 - Humanities Requirement E.2²
- 3 - Literature Requirement¹

16

Second Semester

- 3 - ANTIJ 201 Introduction to Anthropology or
3 - GEOG 101 Introduction to Geography
- 3 - COMM 250 Public Speaking or
3 - COMM 251 Business and Prof. Speaking
- 1 - PRTM 207 Practicum II
- 3 - PRTM 308 Leadership and Group Proc. in Rec.
- 3 - Approved Requirement⁴
- 3 - Elective

16

Junior Year**First Semester**

- 3 - PRTM 307 Facility Planning and Operations
- 3 - PRTM 321 Recreation Administration
- 3 - PRTM 330 Visitor Services and Interpretation
- 1 - PRTM 404 Field Training I
- 3 - Approved Requirement⁴
- 3 - Writing Intensive Requirement¹

16

Second Semester

- 3 - PRTM 305 Safety and Risk Mgt. in PRTM
- 3 - PRTM 309 Behavioral Concepts in PRTM
- 3 - PRTM 320 Recreation Policymaking
- 3 - Approved Requirement⁴
- 6 - Planning Requirement⁴

18

Summer

- 6 - PRTM 405 Field Training II

Senior Year**First Semester**

- 3 - PRTM 403 Elements of Rec. and Park Planning
- 3 - PRTM 409 Methods of Recreation Research I
- 6 - Approved Requirement⁴
- 3 - Elective

15

Second Semester

- 3 - PRTM 431 Methods of Environmental Interpretation
- 3 - PRTM 474 Adv. Recreation Resources Mgt.
- 3 - Approved Requirement⁴
- 3 - Planning Requirement⁶
- 4 - Elective

16

135 Total Semester Hours¹Other General Education Computer Skills courses may be substituted.²See General Education Requirements.³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.⁴Eighteen credit hours in a related minor or 300-400-level courses in a focused program developed in cooperation with and approved by the advisor.⁵ENGL 304 or 314 is recommended.⁶Nine credit hours selected from C R P 401, C R P (E N R) 434, PRTM 343, W F B (BIOSC) 313.

PROFESSIONAL GOLF MANAGEMENT CONCENTRATION

Freshman Year**First Semester**

- 4 - BIOL 103 General Biology I
- 3 - ENGL 101 Composition I
- 3 - PRTM 101 Concepts of Leisure
- 3 - PRTM (FOR) 209 Professional Application of Microcomputers^f
- 3 - Mathematical Sciences Requirement^c

16

Second Semester

- 4 - BIOL 104 General Biology II
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics
- 3 - PRTM 205 Program and Event Planning
- 3 - PRTM 281 Introduction to Golf Management

16

Summer

- 0 - CO-OP 101 Cooperative Education
- 1 - PRTM 206 Practicum I

1

Sophomore Year**First Semester**

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - ECON 211 Principles of Microeconomics
- 3 - PRTM 201 Recreation/Leisure Environment
- 3 - PRTM 308 Leadership and Group Proc. in Rec.
- 3 - Literature Requirement¹

15

Second Semester

- 3 - ACCT 202 Managerial Accounting Concepts
- 3 - MGT 301 Principles of Management
- 3 - PRTM 309 Behavioral Concepts in PRTM
- 3 - PSYCH 201 Introduction to Psychology or
3 - SOC 201 Introduction to Sociology
- 3 - Elective

15

Summer

- 0 - CO-OP 102 Cooperative Education
- 1 - PRTM 207 Practicum II

1

Junior Year**First Semester**

- 0 - CO-OP 103 Cooperative Education

Second Semester

- 3 - FD SC 306 Food Service Operations
- 3 - MKT 301 Principles of Marketing
- 3 - PHIL 103 Introduction to Ethics or
3 - PHIL 344 Business Ethics
- 3 - PRTM 321 Recreation Administration
- 3 - PRTM 344 Tourism Markets and Supply
- 3 - Writing Intensive Requirement⁴

18

Summer

- 3 - COMM 250 Public Speaking or
 - 3 - COMM 251 Business and Prof. Speaking
 - 3 - FIN 306 Corporation Finance
 - 3 - MKT 425 Retail Management
 - 3 - Elective
-
- 12

Senior Year

- First Semester**
- 3 - HORT 208 Landscape Appreciation
 - 3 - MGT 307 Personnel Management
 - 3 - PRMT 305 Safety and Risk Mgt. in PRMT
 - 1 - PRMT 404 Field Training I
 - 3 - PRMT 409 Methods of Recreation Research I
 - 3 - Elective
-
- 16

Second Semester

- 0 - CO-OP 104 Cooperative Education
 - 6 - PRMT 405 Field Training II
-
- 6

Summer

- 0 - CO-OP 105 Cooperative Education
 - 3 - PRMT 483 Golf Club Mgt. and Operations
-
- 3

Third Semester

- 3 - HORT 412 Turfgrass Management
 - 3 - LAW 322 Legal Environment of Business
 - 3 - PRMT 441 Commercial Recreation
 - 7 - Elective
-
- 16

135 Total Semester Hours

¹Other General Education Computer Skills courses may be substituted.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴ENGL 304 is recommended.

SPORT MANAGEMENT CONCENTRATION

Freshman Year

- First Semester**
- 4 - BIOL 103 General Biology I
 - 3 - ENGL 101 Composition I
 - 3 - PRMT 101 Concepts of Leisure
 - 3 - PRMT (FOR) 209 Professional Application of Microcomputers¹
 - 3 - Mathematical Sciences Requirement²
-
- 16

Second Semester

- 4 - BIOL 104 General Biology II
 - 3 - ENGL 102 Composition II
 - 3 - EX ST 301 Introductory Statistics
 - 3 - PRMT 205 Program and Event Planning
 - 3 - Elective
-
- 16

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
 - 3 - PRMT 201 Recreation/Leisure Environment
 - 1 - PRMT 206 Practicum I
 - 3 - PRMT 254 Introduction to Sport Management
 - 3 - PSYCH 201 Introduction to Psychology or
 - 3 - SOC 201 Introduction to Sociology
 - 3 - Literature Requirement³
-
- 16

Second Semester

- 3 - COMM 250 Public Speaking or
 - 3 - COMM 251 Business and Prof. Speaking
 - 3 - ECON 211 Principles of Microeconomics or
 - 3 - ECON 212 Principles of Macroeconomics
 - 3 - MGT 301 Principles of Management
 - 3 - PHIL 103 Introduction to Ethics or
 - 3 - PHIL 344 Business Ethics
 - 1 - PRMT 207 Practicum II
 - 3 - PRMT 308 Leadership and Group Proc. in Rec.
-
- 16

Junior Year

First Semester

- 3 - LAW 312 Commercial Law or
 - 3 - LAW 322 Legal Environment of Business
 - 3 - MKT 301 Principles of Marketing
 - 3 - PRMT 321 Recreation Administration
 - 1 - PRMT 404 Field Training I
 - 3 - Approved Requirement⁴
 - 3 - Writing Intensive Requirement⁵
-
- 16

Second Semester

- 3 - PRMT 305 Safety and Risk Mgt. in PRMT
 - 3 - PRMT 309 Behavioral Concepts in PRMT
 - 6 - Approved Requirement⁴
 - 3 - Business Requirement⁶
 - 3 - Elective
-
- 18

Summer

- 6 - PRMT 405 Field Training II

Senior Year

First Semester

- 3 - HIST 393 Sports in the Modern World or
 - 3 - SOC 441 Sociology of Sport
 - 3 - PRMT 409 Methods of Recreation Research I
 - 3 - PRMT 421 Rec. Financial Resources Mgt. or
 - 3 - FIN 306 Corporation Finance
 - 3 - Approved Requirement⁴
 - 3 - Elective
-
- 15

Second Semester

- 3 - PRMT 454 Trends in Sport Management
 - 6 - Approved Requirement⁴
 - 3 - Business Requirement⁶
 - 4 - Elective
-
- 16

135 Total Semester Hours

¹Other General Education Computer Skills courses may be substituted.

²See General Education Requirements.

³ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁴Eighteen credit hours in one of the following areas: Commercial Sport Management, Institutional Sport Management, Sport Marketing, Sport Communication Management, or Sport Health and Fitness.

⁵ENGL 304 or 314 is recommended.

⁶Selected from 300-400-level courses in management and/or marketing.

THERAPEUTIC RECREATION CONCENTRATION

Freshman Year

First Semester

- 4 - BIOL 103 General Biology I
 - 3 - ENGL 101 Composition I
 - 3 - PRMT 101 Concepts of Leisure
 - 3 - PRMT (FOR) 209 Professional Application of Microcomputers¹
 - 3 - Mathematical Sciences Requirement²
-
- 16

Second Semester

- 4 - BIOL 104 General Biology II
 - 3 - ENGL 102 Composition II
 - 3 - EX ST 301 Introductory Statistics
 - 3 - PRMT 205 Program and Event Planning
 - 3 - Elective
-
- 16

Sophomore Year

First Semester

- 3 - PRMT 201 Recreation/Leisure Environment
 - 1 - PRMT 206 Practicum I
 - 3 - PSYCH 201 Introduction to Psychology
 - 3 - Approved Requirement¹
 - 3 - Humanities Requirement E.2²
 - 3 - Literature Requirement⁴
-
- 16

Second Semester

- 3 - COMM 250 Public Speaking or
 - 3 - COMM 251 Business and Prof. Speaking
 - 1 - PRMT 207 Practicum II
 - 3 - PRMT 308 Leadership and Group Proc. in Rec.
 - 3 - PRMT 311 Therapeutic Recreation
 - 3 - PSYCH 340 Lifespan Developmental Psych.
 - 3 - SOC 201 Introduction to Sociology
-
- 16

Junior Year

First Semester

- 3 - PRMT 321 Recreation Administration
 - 1 - PRMT 404 Field Training I
 - 3 - PRMT 417 Therapeutic Recreation Processes I
 - 3 - PSYCH 483 Abnormal Psychology
 - 3 - Writing Intensive Requirement¹
 - 3 - Elective
-
- 17

Second Semester

- 3 - PRMT 305 Safety and Risk Management
 - 4 - PRMT 418 Therapeutic Recreation Processes II
 - 6 - Approved Requirement¹
 - 3 - Elective
-
- 16

Summer

- 6 - PRMT 405 Field Training II

Senior Year

First Semester

- 3 - PRTM 409 Methods of Recreation Research I
- 3 - PRTM 420 Therapeutic Recreation Trends and Issues
- 6 - Approved Requirement¹
- 3 - Population Specific Course⁶
- 1 - Elective

16

Second Semester

- 3 - PRTM 309 Behavioral Concepts in PRTM
- 3 - PRTM 317 Group Initiatives
- 1 - PRTM 490 Independent Study
- 3 - Approved Requirement¹
- 3 - Population Specific Course⁶
- 3 - Elective

16

135 Total Semester Hours

¹Other General Education Computer Skills courses may be substituted.

⁶See General Education Requirements.

¹⁸Eighteen credit hours in a related minor or 300-400-level courses in a focused program developed with and approved by the advisor.

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

⁵ENGL 304 or 314 is recommended.

⁶See advisor.

TRAVEL AND TOURISM CONCENTRATION

Freshman Year

First Semester

- 4 - BIOL 101 Concepts in Biology I¹ or
 - 3 - GEOL 101 Physical Geology¹ and
 - 1 - GEOL 103 Physical Geology Lab.¹
- 3 - ENGL 101 Composition I
- 3 - PRTM 101 Concepts of Leisure
- 3 - PRTM (FOR) 209 Professional Application of Microcomputers²
- 3 - Mathematical Sciences Requirement¹

16

Second Semester

- 4 - BIOL 102 Concepts in Biology II¹ or
 - 3 - GEOL 112 Earth Resources¹ and
 - 1 - GEOL 114 Earth Resources Lab.¹
- 3 - ENGL 102 Composition II
- 3 - EX ST 301 Introductory Statistics
- 3 - PRTM 205 Program and Event Planning
- 3 - Elective

16

Sophomore Year

First Semester

- 3 - ACCT 201 Financial Accounting Concepts
- 3 - ECON 211 Principles of Microeconomics or
 - 3 - ECON 212 Principles of Microeconomics
- 3 - PRTM 201 Recreation/Leisure Environment
- 1 - PRTM 206 Practicum I
- 3 - PSYCH 201 Introduction to Psychology or
 - 3 - SOC 201 Introduction to Sociology
- 3 - Literature Requirement⁴

16

Second Semester

- 3 - COMM 250 Public Speaking or
 - 3 - COMM 251 Business and Prof. Speaking
- 3 - MKT 301 Principles of Marketing
- 1 - PRTM 207 Practicum II
- 3 - PRTM 308 Leadership and Group Proc. in Rec.
- 3 - Approved Requirement³
- 3 - Humanities Requirement E.2¹

16

Junior Year

First Semester

- 3 - LAW 312 Commercial Law or
 - 3 - LAW 322 Legal Environment of Business
- 3 - PRTM 321 Recreation Administration
- 3 - PRTM 342 Introduction to Tourism
- 1 - PRTM 404 Field Training I
- 3 - Approved Requirement³
- 3 - Writing Intensive Requirement⁶

16

Second Semester

- 3 - PRTM 305 Safety and Risk Mgt. in PRTM
- 3 - PRTM 309 Behavioral Concepts in PRTM
- 3 - PRTM 344 Tourism Markets and Supply
- 1 - PRTM 349 Survey of Tourism Sites
- 3 - Approved Requirement³
- 4 - Elective

17

Summer

- 6 - PRTM 405 Field Training II

Senior Year

First Semester

- 3 - PRTM 343 Spatial Aspects of Tourist Behavior
- 3 - PRTM 409 Methods of Recreation Research I
- 3 - PRTM 430 World Geography of Parks and Equivalent Reserves or
 - 3 - PRTM 447 Perspectives on Inter. Travel
- 3 - PRTM 446 Community Tourism Development
- 4 - Elective

16

Second Semester

- 3 - PRTM 445 Conference/Convention Planning and Management
- 9 - Approved Requirement³
- 4 - Elective

16

135 Total Semester Hours

¹Eight hour sequence in the same science.

²Other General Education Computer Skills courses may be substituted.

³See General Education Requirements.

⁴ENGL 202, 203, 204, 205, 206, 207, 208, 209, or H210.

¹⁸Eighteen credit hours in a related minor or 300-400-level courses in a focused program developed with and approved by the advisor.

⁶ENGL 304 or 314 is recommended.

MINORS

Following are minors acceptable for students in the College of Health, Education, and Human Development. Students cannot major and minor in the same field or acquire a minor that is not allowed by the degree program.

Accounting	History— <i>not open to Secondary Education–History majors</i>
Adult/Extension Education	Horse Production
Aerospace Studies	Horticulture
African American Studies	Human Resource Management
Agricultural Business Management	International Politics
Agricultural Mechanization and Business	Legal Studies
Anthropology	Management
Athletic Leadership	Mathematical Sciences— <i>not open to Mathematics Teaching or Secondary Education–Mathematics majors</i>
Beef Cattle Production	Microbiology
Biochemistry	Military Leadership
Bioengineering	Modern Languages— <i>not open to Secondary Education–Modern Languages majors</i>
Biological Sciences— <i>not open to Science Teaching–Biological Sciences majors</i>	Music
Business Administration	Natural Resource Economics
Chemistry	Operations Management
Cluster	Packaging Science
Communication Studies	Parks, Recreation, and Tourism Management
Communications	Philosophy
Computer Science	Physics— <i>not open to Science Teaching–Physical Sciences majors</i>
Crop and Soil Environmental Science	Plant Pathology
Early Intervention— <i>open to Early Childhood Education, Health Science, and Special Education majors only</i>	Political Science— <i>not open to Secondary Education–Political Science majors</i>
East Asian Studies	Poultry Science
Economics— <i>not open to Secondary Education–Economics majors</i>	Psychology— <i>not open to Secondary Education–Psychology majors</i>
Education— <i>open to Health Science; Nursing; and Parks, Recreation, and Tourism Management majors only</i>	Public Policy
English	Religion
Entomology	Science and Technology in Society
Entrepreneurship	Screenwriting
Environmental Engineering	Sociology— <i>not open to Secondary Education–Sociology majors</i>
Environmental Science and Policy	Spanish-American Area Studies
Film Studies	Textiles
Financial Management	Theatre
Fine Arts	Turfgrass
Food Science	Urban Forestry
Forest Products	Wildlife and Fisheries Biology
Forest Resource Management	Women's Studies
Geography	Writing
Geology	
Great Works	
Health Science	

See pages 35-38 for details.

COURSES OF INSTRUCTION

This list of courses includes for each course the catalog number, title, credit hours, class and laboratory hours per week, and the description. Courses numbered 600 and above are graduate courses. Computer skills, oral communication, and writing intensive equivalencies are noted in brackets (e.g., [W/3]). Where courses are offered on a schedule, there is a designation F, S, M, or SS following the title, indicating whether the course is offered in the fall, spring, Maymester, or summer school.

Cross-Listed Courses

A cross-listed course is one that can be taken for credit under different departmental titles. For example, students can take *Demography* as either R S 471 or SOC 471. The student should select the desired departmental title in conference with an advisor. The departmental title may be changed only during the period allowed by the University calendar for adding a course.

COURSE ABBREVIATIONS

Accounting	ACCT
Aerospace Studies	A S
African American Studies	A A S
Agricultural and Applied Economics	AP EC
Agricultural Education	AG ED
Agricultural Mechanization	AG M
Agriculture	AGRIC
Agriculture, Forestry, and Life Sciences	AFLS
American Sign Language	A S L
Animal and Veterinary Sciences	AVS
Animal Physiology	AN PH
Anthropology	ANTH
Architecture	ARCH
Art	ART
Art and Architectural History	A A H
Astronomy	ASTR
Athletic Leadership	A L
Biochemistry	BIOCH
Bioengineering	BIO E
Biological Sciences	BIOSC
Biology	BIOL
Biosystems Engineering	B E
Botany	BOT
Business	BUS
Business Administration	M B A
Calhoun Honors Seminar	C H S
Career and Technology Education	CTE
Ceramic and Materials Engineering	C M E
Chemical Engineering	CHE
Chemistry	CH
Chinese	CHIN
City and Regional Planning	C R P
Civil Engineering	C E
Clemson University	C U
College of Engineering and Science	CES
Communication Studies	COMM
Community and Rural Development	C R D
Computer Science	CP SC
Construction Science and Management	C S M
Crop and Soil Environmental Science	CSENV
Dance	DANCE

Design Studies	DSIGN
Early Childhood Education	ED EC
East Asian Studies	E A S
Economics	ECON
Education	ED
Educational Counseling	ED C
Educational Foundations	ED F
Educational Leadership	ED L
Electrical and Computer Engineering	E C E
Elementary Education	ED EL
Engineering	ENGR
Engineering Graphics	E G
Engineering Mechanics	E M
English	ENGL
Entomology	ENT
Environmental and Natural Resources	E N R
Environmental Engineering and Science	EEES
Environmental Science and Policy	EN SP
Environmental Toxicology	ENTOX
Executive Leadership and Entrepreneurship	E L E
Experimental Statistics	EX ST
Finance	FIN
Food Science	FD SC
Food Technology	FD TH
Forest and Recreation Resources	F&RR
Forest Resources	FOR
French	FR
Genetics	GEN
Geography	GEOG
Geology	GEOL
German	GER
Government and International Trade	GINT
Graduate Studies	G S
Graphic Communications	G C
Great Works	G W
Health	HLTH
Health, Education, and Human Development	HEHD
Historic Preservation	H P
History	HIST
Horticulture	HORT
Human Resource Development	H R D
Humanities	HUM
Industrial Engineering	I E
Integrated Pest Management	I P M
Italian	ITAL
Japanese	JAPN
Landscape Architecture	LARCH
Language	LANG
Language and International Trade	L&IT
Latin	LATIN
Law	LAW
Leisure Skills	L S
Management	MGT
Marketing	MKT
Materials Science and Engineering	MS&E
Mathematical Sciences	MTHSC
Mechanical Engineering	M E
Microbiology	MICRO
Military Leadership	M L
Music	MUSIC
Nonprofit Leadership	NPL
Nursing	NURS
Nutrition	NUTR
Packaging Science	PKGSC
Parks, Recreation, and Tourism Management	PRTM
Performing Arts	P A

Philosophy	PHIL
Physical Science	PH SC
Physics	PHYS
Plant and Environmental Sciences	PES
Plant Pathology	PL PA
Plant Physiology	PL PH
Policy Studies	PO ST
Political Science	PO SC
Polymer and Textile Chemistry	PTC
Portuguese	PORT
Psychology	PSYCH
Reading	READ
Real Estate Development	RED
Religion	REL
Rural Sociology	R S
Russian	RUSS
Secondary Education	ESEC
Sociology	SOC
Spanish	SPAN
Special Education	ED SP
Technology and Human Resource Development	THRD
Textile Management	TEXT
Theatre	THEA
Transition to Teaching	TTT
Vocational-Technical Education	VT ED
Wildlife and Fisheries Biology	W F B
Women's Studies	W S
Zoology	ZOOL

ACCOUNTING

Professors: L. S. Cash, T. L. Dickens, R. K. Doost, G. T. Friedlob, J. J. McMillan, R. E. Welton, Jr., Director; A. J. Winters; *Associate Professors:* L. S. Clark, D. M. Guffey, L. F. Schleifer; *Assistant Professors:* R. B. Dull, F. A. Kennedy, D. D. McIntyre; *Lecturers:* R. G. Littleton, J. R. Madray, M. A. Prater, M. L. Walker

ACCT 201, H201 Financial Accounting Concepts 3(3,0) Introduction to accounting principles with emphasis on the use of financial data and analysis of financial statements.

ACCT 202, H202 Managerial Accounting Concepts 3(3,0) Introduction to managerial accounting with emphasis on using accounting information to make decisions.

ACCT 204 Accounting Procedures 1(1,2) Lectures, demonstrations, and hands-on experience with accounting systems and analysis required to complete the accounting cycle and prepare financial statements. Intended for students who plan to enroll in ACCT 303 or 311.

ACCT 303, H303 Cost Accounting 3(3,0) Application of cost analysis to manufacturing and distributing problems; analysis of behavior characteristics of business costs and a study of principles involved in standard cost systems; lectures and problems. *Preq:* ACCT 201 and 204 with a C or better.

ACCT 307, H307 Managerial Accounting 3(3,0) Emphasizes internal use of accounting data by the manager in establishing plans and objectives, controlling operations, and making decisions involved with management of an enterprise. May not be taken for credit by Accounting majors. *Preq:* ACCT 202.

ACCT 311 Intermediate Financial Accounting I 3(3,0) In-depth treatment of traditional financial accounting topics of standards setting, financial statement form and content, and accounting and reporting of current assets. Emphasis is on basic theory, valuation, and measurement, as well as presentation and analysis of accounting information. *Preq:* ACCT 201 and 204 with a C or better.

ACCT 312 Intermediate Financial Accounting II 3(3,0) Continuation of ACCT 311. In-depth treatment of accounting and reporting for noncurrent assets, current and noncurrent liabilities, and equity. Emphasis is placed on basic theory, valuation, and measurement issues, as well as presentation and analysis of accounting information. *Preq:* ACCT 311 with a C or better.

ACCT 313 Intermediate Financial Accounting III 3(3,0) Continuation of ACCT 312. In-depth treatment of selected accounting topics, such as investments, cash flows, tax allocation, post-retirement benefits, leases, and error corrections. Emphasis is placed on basic theory, valuation, and measurement, as well as presentation and analysis of accounting information. *Preq:* ACCT 312 with a C or better.

ACCT 322 Accounting Information Systems 3(3,0) Study of computer-based accounting systems with attention to systems design, application, internal control, auditing the system, and system security. *Preq:* CP SC 220.

ACCT 340 Internal Auditing Theory 3(3,0) Introduces students to internal auditing and covers internal auditing standards, ethics, concepts, audit techniques, and reporting practices. Enrollment priority will be given to students who have completed 60, but not more than 100, credits. *Preq:* ACCT 311 with a C or better.

ACCT 399 Internship in Accounting 1-3(1-3,0) Faculty-supervised accounting internship designed to give students learning opportunities that support their classroom experiences. Requires a minimum of six full-time weeks. Course enrollment and internship must occur in the same semester. Simultaneous credit cannot be received for another internship offering. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Preq:* Junior standing and consent of instructor.

ACCT 404, H404, 604 Individual Taxation 3(3,0) Interpretation of Federal income tax laws, regulations, and court decisions with practice in application of these laws to the returns of individuals, partnerships, and corporations. *Preq:* ACCT 311 with a C or better.

ACCT 406 Business Taxation 3(3,0) Provides an introduction to the importance of taxation in business decision making; emphasizes the interrelationship of taxes, the choice of business form, and various business transactions; exposes students to the breadth of business decisions which are affected by the Federal Income Tax. *Preq:* ACCT 311 with a C or better.

ACCT 408 Retirement and Estate Planning 3(3,0) Provides students with an understanding of the tax consequences of personal financial, retirement, and estate planning. Subjects covered include the basic concepts of retirement, gift, income shifting, and estate planning. *Preq:* ACCT 404 with a C or better.

ACCT 410 Budgeting and Executive Control 3(3,0) Study and application of selected techniques used in the planning and control functions of business organizations. *Preq:* ACCT 303 with a C or better.

ACCT 415 Auditing 3(3,0) Professional and practical auditing theory. Review of internal controls, audit procedures, and development of audit programs for various types of businesses; consideration of auditors' professional and ethical standards. *Preq:* ACCT 311 and 322 with a C or better.

ACCT 445 Internal Auditing Practice 3(3,0) Expands the students' knowledge of internal auditing practice, including operation audits, organization audits, quality-control audits, and organization theory. *Preq:* ACCT 340 with a C or better.

AEROSPACE STUDIES

Professor: E. B. Delulio, *Chair*; *Assistant Professors:* D. W. Butler, T. L. Dutcher, T. E. Livingston

A S 109 Air Force Today I 2(1,2) Deals with Air Force in the contemporary world through a study of the total force structure: strategic offensive and defensive, general purpose, and aerospace support. Leadership laboratory activities include drill fundamentals, customs, and courtesies of the service.

A S 110 Air Force Today II 2(1,2) Continuation of A S 109. Leadership laboratory includes drill, ceremonies, and an introduction to Air Force career opportunities.

A S 209 Development of Air Power I 2(1,2) Study of the development of air power from balloons and dirigibles through the peaceful employment of U.S. air power in relief missions and civic action programs in the late 1960s and also the air war in Southeast Asia. Leadership laboratory provides experience in guiding, directing, and controlling an Air Force unit.

A S 210 Development of Air Power II 2(1,2) Continuation of A S 209.

A S 308 Air Force Leadership and Management 3(3,0) Motivational and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for development of the leader's professional skills using Air Force examples and methods.

A S 309 Air Force Leadership and Management I 4(3,2) Emphasizes the individual as a manager. Individual motivational and behavioral processes, leadership, communication, and group dynamics are covered to provide a foundation for the development of the Air Force officer's professional skills. Students prepare individual and group presentations, write reports, participate in group discussions, seminars, and conferences.

A S 310 Air Force Leadership and Management II 4(3,2) Continuation of A S 309. Uses the basic managerial processes involving decision making, utilization of analytical aids in planning, organizing, and controlling environment. Actual case studies are used to enhance learning and communication processes.

A S 409 National Security Policy I 4(3,2) Analysis of the role and function of the military officer in a democratic society and the relationships involved in civil-military interactions. Students prepare individual and group presentations, write reports, and participate in group discussions.

A S 410 National Security Policy II 4(3,2) Continuation of A S 409. Examines the environmental context in which U.S. defense policy is formulated and implemented. Emphasis is placed on initial commissioned service and military justice. Students prepare individual and group presentations for the class, write reports, and participate in group discussions, seminars, and conferences.

AFRICAN AMERICAN STUDIES

Professor: J. M. Burns

A A S 301 Introduction to African American Studies 3(3,0) Study of African American experience from an Afrocentric perspective from colonial America to the present.

A A S 498, 698 Seminar on African American Studies 3(3,0) Research/writing seminar on the African American experience. Selected topics and themes from 1900 to present. *Preq:* A A S 301, HIST 311, 312 or 339.

AGRICULTURAL AND APPLIED ECONOMICS

Professors: D. L. Barkley, L. L. Bauer, M. D. Hammig, *Chair*; M. S. Henry, E. H. Kaiser, S. E. Miller, J. C. O. Nyankori, C. M. Sieverdes, W. M. Smathers Jr., W. M. Ward, G. J. Wells; *Associate Professor:* M. Espey; *Assistant Professor:* S. R. Templeton

AP EC 202 Agricultural Economics 3(3,0) Analytical survey of the various subdivisions of agricultural economics, including farm organization, enterprise, land economics, marketing, farm prices, governmental farm policies, and the relation of agriculture to the national and international economy.

AP EC 257 Natural Resources, Environment, and Economics 3(3,0) Economic principles applied to resource allocation problems related to environmental and natural resource issues.

AP EC 302 Economics of Farm Management 3(2,3) Economic principles underlying the organization and operation of agricultural firms and related business enterprises. Particular emphasis is directed to management aspects of the farm as a production unit. *Preq:* AP EC 202 or ECON 211.

AP EC 308 Quantitative Applied Economics 3(3,0) Basic quantitative relationships in applied economics are examined and interpreted. Emphasis is placed on the mathematical aspects of applied economics. Microcomputer software is utilized for problem solving.

AP EC 309, H309 Economics of Agricultural Marketing 3(3,0) General course in marketing agricultural commodities with particular emphasis upon food products. Efficiency criteria, consumer behavior, market organizations and institutions, and marketing functions are analyzed. *Preq:* AP EC 202.

AP EC 313 Principles of Real Estate Appraisal 3(3,0)JS Introduction to basic principles and procedures of real estate appraisal. Topics include the real estate market, principles of valuation, legal concepts, and the application of the comparable sales, cost, and income approaches to real estate valuation. *Preq:* FIN 307 or consent of instructor.

AP EC 319 Agribusiness Management 3(3,0)F Study of the principles used in making management decisions and the application of these principles in agribusiness. Emphasis is given to the application of economics to the solution of problems facing managers of agricultural supply and marketing firms. *Preq:* AP EC 302 or 309.

AP EC 351 Principles of Advertising 3(3,0)S Introduction to the various functions of advertising; research and audience analysis; various media formats; planning, research, and production necessary to create an advertising campaign; social effects, economic effects, and ethical considerations of advertising.

AP EC 352 Public Finance 3(3,0)S Principles of financing government, sources of public revenue, objects of public expenditures, problems of fiscal administration, and the application of fiscal policies in stabilizing the national economy. *Preq:* Junior standing.

AP EC (C R D, HLTH) 361 Introduction to Health-Care Economics 3(3,0) See C R D 361.

AP EC 402, 602 Production Economics 3(3,0)F Economic analysis of agricultural production involving the concept of the farm as a firm; principles for decision making; the quantitative nature and use of production and cost functions and the interrelations and applications of these principles to resource allocation in farms and among areas. *Preq:* AP EC 308, ECON 314.

AP EC 403, 603 Land Economics 3(3,0)S Study of the characteristics of land and of the physical, legal, social, and economic principles and problems relating to the control and use of land resources. *Preq:* AP EC 202 or ECON 200.

AP EC 409, 609 Commodity Futures Markets 3(3,0) Introduction to the economic theory, organization, and operating principles of agricultural commodity futures markets in the United States. Emphasis is placed on speculating, hedging, and investing in agricultural commodity futures contracts from the standpoint of the agribusiness entrepreneur. *Preq:* AP EC 202 or ECON 211.

AP EC (C R D) 411, 611 Regional Impact Analysis 3(3,0) See C R D 411.

AP EC (C R D) 412, 612 Regional Economic Development Theory and Policy 3(3,0) See C R D 412.

AP EC 413, 613 Advanced Real Estate Appraisal 3(3,0)S Topics include highest and best use analysis, data collection, and analyses. Advanced appraisal procedures for income, cost, and comparable sales approach to real estate valuation are stressed. Eminent domain, the appraisal of property in transition, and specialized property are covered. *Preq:* AP EC 313, FIN 307, or consent of instructor.

AP EC 420, 620 World Agricultural Trade 3(3,0)S Practical considerations of agricultural trade and trade policy analysis are reviewed. The role of international institutions is considered. Special emphasis is placed on concepts of agricultural trade, analysis of trade policies of major trading partners/competitors, and export/import marketing of products. *Preq:* AP EC 309, ECON 412, or consent of instructor.

AP EC 421, 621 Globalization 3(3,0) Utilizes basic principles of international economics (comparative advantage, free trade vs. protectionism, exchange rate determination, etc.) to analyze the contemporary problems and issues of the world economy. Emphasizes application of economic principles to current globalization trends. *Preq:* ECON 310 or 412 or 413 or consent of instructor.

AP EC (CSENV) 426, 626 Cropping Systems Analysis 3(2,2)F See CSENV 426.

AP EC 433, 633 Agricultural Law and Related Environmental Issues 3(3,0)S Introduction to agricultural and agricultural-related environmental legal issues. Topics include a review of laws, agencies, programs, court structure, torts, taxation, biotechnology, land and water use, regulated industry, and environment liabilities as they relate to agriculture and natural resources. *Preq:* LAW 322 or consent of instructor.

AP EC 452, H452, 652 Agricultural Policy 3(3,0)F Review of public agricultural policy programs in the United States and a critical examination of current and proposed government policies and programs affecting the agricultural sector of the economy. Economic considerations as related to past and current farm price and income problems are included. *Preq:* AP EC 302, 309.

AP EC 456, H456, 656 Prices 3(3,0)S Review of the basic theory of price under competitive conditions and various modifications; nature, measurement, and causes of daily, seasonal, and cyclical price fluctuations; geographical price relationships; nature, function, and behavior of futures markets; government price programs. *Preq:* AP EC 308, ECON 314, EX ST 462.

AP EC 457, 657 Natural Resource Economic Theory and Policy 3(3,0) Focuses on analysis of actual, efficient, and sustainable use of natural resources. Topics may vary but include land-use change and regulation, water use and marketing, harvesting trees or fish on farms, harvesting and developing property rights to open-access resources, renewable versus nonrenewable energy use, and sustainable development. *Preq:* MTHSC 102; C R D 357 or ECON 314.

AP EC 460, 660 Agricultural Finance 3(3,0)S Study of the principles and technique of financing in the agricultural sector. Topics include the capital situation in agriculture, concepts of farm financial management, use of credit, capital markets, lending agencies, and estate planning. *Preq:* ACCT 200 or 201, AP EC 202.

AP EC 475, 675 Economics of Wildlife Management and Policy 3(3,0) Integrated approach to the study of the economics of wildlife. Topics include determination of market and nonmarket value, single and multiple species management, enterprise cost and returns, marketing wildlife, leasing methods, complementarity and competi-

tiveness with agricultural and forestry enterprises, and timber and crop damage cost estimates and control. *Preq:* AP EC 202, ECON 200, FOR 304, W F B 306, or consent of instructor.

AP EC 490 Selected Topics 1-15(0,2-30) Study of topics in applied economics. Topics may include classroom and/or field experience not normally covered in other classes. May be repeated for credit, but only if different topics are covered. *Preq:* Junior standing and/or consent of instructor.

AP EC (C R D) 491 Internship, Agribusiness, and Community and Rural Development 1-6(0,2-12) See C R D 491.

AGRICULTURAL EDUCATION

Associate Professors: T. R. Dobbins, P. M. Fraivel, D. R. King, S. A. Sparace, C. D. White, Sr.; *Assistant Professor:* K. D. Layfield

AG ED 100 Orientation and Field Experience 1(0,2,0)S Supervised observations and explanations of vocational agriculture teaching while serving as teacher aides. One full week of field experience in representative high schools is required.

AG ED 102 Agricultural Education Freshman Seminar 1(2,0) Introduces students to the South Carolina agriculture education structure and provides opportunities to prepare oral presentations on selected agricultural education organizations. Assists students in understanding the value of professional organizations to agriculture education in the state and nation. *Preq:* Agricultural Education major.

AG ED 103 Multiculturalism in Agricultural Education 3(3,0) Studies the influence of various groups and their contributions to agriculture. Includes the roles of women, African-, Hispanic-, Asian-, Native-, and European-Americans.

AG ED 200 Agricultural Applications of Microcomputers 3(2,2) [C.3] Overview of microcomputer hardware and software encompassing word processing, spreadsheet, database management, utility, and graphic communications. Also includes specialized farm and agribusiness management and decision-making programs and criteria for evaluating and selecting hardware.

AG ED 201 Introduction to Agricultural Education 3(2,3)F Principles of education, development of agricultural education, and an introduction to the formulation of instructional programs for the teaching of agricultural courses.

AG ED 202 Agricultural Education Sophomore Seminar 1(2,0) Instruction on how to establish a comprehensive student record-keeping system. Integration of that data into the FFA Awards program is included. Allows students hands-on experience with the total FFA Awards program on the state and national level. *Preq:* AG ED 102.

AG ED 203 Teaching Agriscience 4(3,3) Integrates biological and technological concepts appropriate for teaching introductory middle or secondary school level courses in agricultural science. Topics emphasize disciplines, theories, and applications in modern agricultural production. Experiences include teaching techniques, materials, resources, and the design and implementation of new activities to facilitate teaching agriscience. *Preq:* BIOL 104.

AG ED 302 Agricultural Education Junior Seminar 1(2,0) Allows students the opportunity to prepare and deliver information on Career Development Events (CDE) and to fully understand the CDE concepts. Students receive much needed hands-on experience at the state and national levels. *Prq:* AG ED 202.

AG ED 303 Mechanical Technology for Agriculture Education 3(2,3) Study of technical content and new technology utilized in agriculture mechanics. Integrates agriculture mechanics topics such as electrical wiring and controls, green industry maintenance, irrigation systems, and agriculture construction. Offers a delivery of mechanics instruction in the classroom and laboratory setting.

AG ED 400 Supervised Field Experience II 1(0,3)F Special emphasis is placed on enhancing existing knowledge and experiences of the students. Primary focus is on becoming acquainted with the student teaching center well in advance of the customary twelve-week directed teaching experience.

AG ED 401, 601 Methods in Agricultural Education 3(2,3) Appropriate methods of teaching vocational agriculture in high schools. Includes procedures for organizing teaching programs, teaching high school students, and directing FFA activities.

AG ED 402 Agricultural Education Senior Seminar 1(2,0) Provides an opportunity to prepare and deliver information on continuing adult education. Assists students in fully understanding the adult education component of the total Secondary Agriculture Education Program. *Prq:* AG ED 302.

AG ED 403, 603 Principles of Adult/Extension Education 3(3,0) Overview of adult/extension education and adult learning. Selection of adult education providers is reviewed with emphasis on extension. *Prq:* Junior standing or consent of instructor.

AG ED 404 Biotechnology in Agricultural Education 3(2,3) Multidisciplinary introduction to theories and applications of biotechnology in agriculture and high school agricultural education. Topics include common techniques used in modern biotechnology, examples of their applications, and social considerations that impact the use of biotechnology in agricultural research and development. Laboratories illustrate principles covered in lecture. *Prq:* BIOL 104.

AG ED 406 Directed Teaching 12(0,36)S Guided participation in the professional responsibilities of a teacher of vocational agriculture including intensive study of the problems encountered and competencies developed. Twelve weeks of directed teaching in selected schools are required. *Prq:* AG ED 400, 401.

AG ED 407 Internship in Extension and Leadership Education 6-12(0,18-36) Internship placements may include county extension offices and other appropriate extension units. Six weeks of supervised experience must be completed for six hours of credit. Twelve weeks of supervised experience must be completed for 12 hours of credit. May be repeated for a maximum of 12 credits. *Prq:* AG ED 400, 401, Senior standing, and consent of instructor.

AG ED 409, 609 AgriScience Institute: Applications of Agriscience to the Secondary Curriculum 3(2,2) Designed for pre-service and in-service agricultural educators or secondary level counselors. Surveys current developments in agriscience with an emphasis on modern practices, current job opportunities, and meeting state and national science and math education standards through agricultural instruction. Students construct lesson plans and career planning modules for high school. *Prq:* AG ED 102.

AG ED 412 Senior Agriculture Leadership Seminar 1(2,0) Emphasizes leadership techniques and policies that affect agriculture. Requires students to conduct research and make presentations on agriculture issues which influence agriculture policy. *Prq:* AP EC 202, 302.

AG ED 423, 623 Curriculum 2(2,0)S Curriculum goals and related planning for career and continuing education programs.

AG ED 425, 625 Teaching Agricultural Mechanics 2(1,3)S Organizing course content, conducting and managing an agricultural mechanics laboratory, shop safety, microteaching demonstrations of psychomotor skills, and methods of teaching manipulative abilities.

AG ED 428, 628 Special Studies in Agricultural Education 1-3(1-3,0) Students study, individually or collectively, selected topics and/or problems in agricultural education to meet the particular needs of the clientele enrolled. May be repeated for a maximum of six credits.

AG ED 431, 631 Methods in Environmental Education 3(3,0) Study of various techniques appropriate for teaching environmental education. Instruction is applicable to elementary, high school, and adult-level teachers. Summer school only.

AG ED 440, 640 Program Development in Adult/Extension Education 3(3,0) Principles, theory, and practice in planning and conducting educational programs in adult/extension settings. *Prq:* Junior standing or consent of instructor.

AG ED (E, F, THRD) 480, 680 Educational Applications of Microcomputers 3(2,2) [C.3] See ED F 480.

AG ED (E, F, THRD) 482, 682 Advanced Educational Applications of Microcomputers 3(2,2) See ED F 482.

AGRICULTURAL MECHANIZATION

Professors: W. H. Allen, *Chair*; D. E. Brune, J. A. Collier, R. B. Dodd, Y. J. Han, D. E. Linvill; *Assistant Professor:* T. O. Owino

AG M 101 Introduction to Agricultural Mechanization and Business 1(0,3) Introduction to the Agricultural Mechanization and Business program. An overview of the curriculum is given and the opportunities for extracurricular activities explained. Long-term interaction between the department and alumni is covered.

AG M 205 Principles of Farm Shop 3(2,3) Principles, techniques, and methods in the selection, proper use, and maintenance of hand and power tools. Principal topics include welding, tool fitting, metalworking, woodworking, finishing and preserving, and heat treatment.

AG M 206 Agricultural Mechanization 3(2,3) Agriculture students are taught to apply physical principles and sound reasoning to the mechanization of modern agricultural production and processing enterprises. Planning efficient operational systems and wise selection of equipment, based on function and economic suitability are stressed. *Prq:* MTHSC 105, PHYS 207 or consent of instructor.

AG M 301 Soil and Water Conservation 3(2,3) Water management in agriculture is studied by applying principles of elementary surveying, mathematics, and fluid flow as related to soil-water-vegetation complexes in erosion control, water conservation, drainage, and irrigation.

AG M 303 Calculations for Mechanized Agriculture 3(2,3) Enhances students' ability to analyze and solve a wide range of problems requiring engineering technology. Laboratory periods introduce students to microcomputer hardware. Basic programming and typical applications to agricultural mechanization problems are included. *Prq:* PHYS 207 or consent of instructor.

AG M 401, 601 Environmental Control for Plants and Animals 1(1,0) Basic concepts of environmental control for plant and animal production and human housing are presented. Elements include heat transfer, psychrometry, heating, cooling, ventilation, and heat/moisture balances. *Prq:* PHYS 200 or consent of instructor.

AG M 402, 602 Drainage, Irrigation, and Waste Management 3(2,3) Basic soil-water-plant relationships are used to determine the need for and methods of irrigation, drainage, and waste management. Topics include irrigation methods, drainage needs, drainage methods, and waste-treatment methods.

AG M 403, 603 Structures for Plants and Animals 2(1,3) Structures for agricultural production systems are planned and designed with regard to function, materials, loads, and component sizing, utilizing the approach of an engineering or construction technologist. *Prq:* PHYS 200 or consent of instructor.

AG M 406, 606 Mechanical and Hydraulic Systems 3(2,3) Study of power transmission systems for agricultural production with emphasis on mobile equipment. Characteristics, requirements, and design of both V-belt drive and roller-chain drives are presented. Emphasizes hydraulic power transmission systems, including pumps, actuators, control devices, and hydraulic circuitry. *Prq:* AG M 206, PHYS 207 or consent of instructor.

AG M 408 Equipment Sales and Service 3(3,0) Agricultural equipment sales and service techniques, inventory, and accounting procedures followed by the farm machinery industry.

AG M 410, 610 Precision Agriculture Technology 3(2,3) Principles and hands-on application of technologies supporting precision agriculture are included. Topics include global positioning system (GPS), geographic information system software, variable rate technologies, collection of spatial data, automated guidance of equipment, spatial data mapping and analysis, remote sensing, and economic considerations. *Prq:* Junior standing.

AG M 452, 652 Farm Power 3(2,3) Study of tractors with emphasis on internal combustion engines and support systems necessary for their proper functioning. Application of power, maintenance, adjustment, and general repair are also considered. *Preq:* PHYS 207 or consent of instructor.

AG M 460, 660 Farm and Home Utilities 3(2,3) Students in agriculture and related curricula study electric and other utilities on the farm and in the home. Selection, installation, and maintenance of wiring systems, lighting systems, motors, controls, water systems, and waste disposal systems are emphasized. *Preq:* PHYS 208 or consent of instructor, Junior standing.

AG M 472 Seminar 1(1,0) Introduction to the agribusiness world, professionalism, current topics of special interest, and financial and legal implications of modern agricultural production. *Preq:* Senior standing in Agricultural Mechanization and Business or consent of instructor.

AG M 473 Special Topics in Agricultural Mechanization 1-3(1-3,0) Comprehensive study and application of new technologies and methods not covered in existing courses. Emphasis is placed on independent study using innovative approaches to problem solving. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

AGRICULTURE

Professors: L. L. Bauer, D. E. Linvill, V. L. Quisenberry, P. A. Skewes; *Associate Professor:* W. C. Stringer

AGRIC 103 Introduction to Animal Industries 3(3,0) Fundamental and descriptive aspects of animal industries as applied biology and major segments of food production and distribution systems. Subject matter is presented by Animal and Veterinary Sciences Department. Not open to students who have received credit for AVS 202.

AGRIC 104, H104 Introduction to Plant Sciences 3(3,0) Fundamental course in plant sciences, including agronomic and horticultural crops of the major agricultural areas of the world and emphasizing the crops of South Carolina.

AGRIC 105 Agriculture and Society 3(3,0) Examination of the structure, function, and importance of the food and resource base, production, supply, marketing, demand, capital, labor markets, and consumption behavior in the U.S.; economic and sociological issues affecting U.S. agriculture.

AGRIC (EN SP) 315, H315 Environment and Agriculture 3(3,0) Survey of the interrelationships of the environment and current agriculture and agricultural practices to include both the environmental impacts of agriculture and the role of agriculture in conservation and improving the environment. *Preq:* Sophomore standing and two semesters of biology or chemistry.

AGRIC 440, 640 Microclimatology 3(3,0) Study of energy balance in earth's atmosphere and soil; solar and thermal radiation, air and soil temperature, humidity, evaporation and the hydrologic cycle, wind fields. Weather variables to describe microclimates and the energy balance of plants, animals, and insects. Modification of microclimates. Rural and urban climates. *Preq:* PHYS 240 or equivalent or consent of instructor; second semester Junior standing.

AGRIC H491 Senior Honors Research 3(1,6) Senior division honors research in an agricultural sciences curriculum. In consultation with and under the direction of a professor, students select a research topic, conduct experiments, record data, and make oral presentations of results to the College Honors Program Committee. Open to approved Honors Program students only.

AGRIC H492 Senior Honors Research 3(1,6) Continuation of AGRIC H491. Senior division honors research in an agricultural sciences curriculum. Upon termination of the research project, students submit formal written reports and make final oral presentations of results to the College Honors Program Committee. Professor-student discussions of additional topics will be arranged.

AGRICULTURE, FORESTRY, AND LIFE SCIENCES

AFLS 191 Directed Research 1-3(0,3-9) Research projects, supervised by faculty in the College of Agriculture, Forestry, and Life Sciences introducing research methods. Restricted to outstanding high school students, selected using Governor's School for Science and Mathematics ranking criteria. May be repeated for a maximum of six credits. *Preq:* Entering high school junior or senior status and consent of faculty research supervisor and department in which research is conducted.

AMERICAN SIGN LANGUAGE

Associate Professor: W. A. Brant; *Lecturer:* B. Jordan

A S L 101 American Sign Language I 4(3,1) Introduction to the basics of American Sign Language, its history, and culture. Visual-gestural communication techniques are used.

A S L 102 American Sign Language 14(3,1) Continuation of A S L 101 and culture to develop further communicative competencies. Proficiency oriented with the use of visual-gestural communication skills. *Preq:* A S L 101 or consent of instructor.

A S L 201 American Sign Language II 3(3,0) Continuation of A S L 102. Covers additional vocabulary, sentences, and grammar structures. Main focus is on conversational and receptive skills as well as a better understanding of Deaf culture. *Preq:* A S L 102 or consent of instructor.

A S L 202 American Sign Language II 3(3,0) Continuation of A S L 201, concentrating on intermediate conversational and discourse skills using American Sign Language, more complex American Sign Language grammar, reading comprehension, and composition of short stories, narratives, and dialogues with an emphasis on topics related to the Deaf community. Class is conducted totally in American Sign Language using visual-gestural communicative techniques. *Preq:* A S L 201 or consent of instructor.

A S L 305 Deaf Studies in the United States 3(3,0) In-depth look into language, culture, and daily lives of approximately one million people who use American Sign Language as their primary language. Traces the roots of American Sign Language from pre-revolutionary times to current science and knowledge and how it applies to professional fields. Taught in American Sign Language. *Preq:* A S L 202 or consent of instructor.

ANIMAL AND VETERINARY SCIENCES

Professors: J. A. Bertrand, G. P. Birtenkott, Jr., A. B. Bokline II, Charr, T. Gimenez, A. K. Greene, T. C. Jenkins, J. C. McConnell, Jr., D. V. Maurice, T. R. Scott, P. A. Skewes; *Associate Professors:* M. A. Hall, L. Olson; *Assistant Professor:* S. Ellis; *Lecturers:* B. G. Bolt, P. A. Evans

AVS 100 Orientation to Animal, Dairy, and Veterinary Sciences 1(2,0) Study of the role of animal agriculture in the world today with emphasis on supply and demand of end products and careers available in the animal industry.

AVS 101 Dairy Foods 1(1,0) Production aspects of dairy foods from the farmer to the consumer including such products as ice cream, yogurt, and various cheeses; the use of these foods for nutrition and pleasure. Students who have received credit for AVS 430 will not be allowed to enroll in or receive credit for AVS 101.

AVS 102 Mammalian Reproduction 1(1,0) Physiology and endocrinology of the reproductive processes in male and female mammals with emphasis on farm animals. Control of reproductive cycles, diseases, sexuality, and effects of drugs on reproduction are discussed.

AVS 108 Animal and Dairy Science Techniques 1(0,2) Basic principles in handling of livestock and techniques of animal industries are discussed. Basics of animal anatomy and equipment and facilities used in animal production are presented.

AVS 110 Avian Pets—Biology and Owner Responsibilities 1(1,0) Systematic coverage of the many types of birds that humans keep as social companions. Nutrition, environmental considerations, reproductive habits, health, and legal and economic aspects of these pets are considered.

AVS 120 Poultry Techniques 1(0,2) Basic principles in the handling and production of poultry are discussed and demonstrated. Students receive hands-on experience and visit commercial operations to view equipment, facilities, and production techniques. *Preq:* Consent of instructor.

AVS 201 Poultry Husbandry 3(3,0) Study of the principles of poultry production and marketing and of the anatomy and physiology of the economically important poultry and game bird species. *Preq:* Consent of instructor.

AVS 202 Introductory Animal Sciences 4(4,0) Systematic coverage of the basic principles involved in breeding, feeding, management, and product marketing in beef and dairy cattle, swine, sheep, goat, horse, and poultry operations. Not open to students who have received credit for AGRIC 103.

AVS 203 Dairy Science Techniques 1(0,2)F Laboratory demonstrating the basics of breeding, feeding, and management of dairy cattle, quality control of milk, and processing of milk and dairy products. *Preq:* AVS 108.

AVS 204 Horse Care Techniques 1(0,2) Common skills to safely handle, restrain, and work around horses with special emphasis on management strategies to optimize the health, comfort, and productivity of the horse. *Preq:* AVS 108.

AVS 205 Light Horse Management 2(1,2)F Light horse industry—development of breeds and their uses. Breeding, feeding, and management of light horses. Fundamental instruction in equitation. *Preq:* AVS 202 and 204 or consent of instructor.

AVS 210 Animal Science Techniques 1(0,2)F Livestock handling techniques used in the animal industry are discussed. Principles of animal care and management for livestock production are emphasized. *Preq:* AVS 108.

AVS 302 Principles of Livestock Selection 2(1,2)S Pedigrees, performance records, and visual appraisal techniques are integrated to teach students to identify livestock to be kept for breeding purposes. Students are eligible to compete in intercollegiate selection contests.

AVS 303 Livestock Evaluation 2(1,2)F Modern selection parameters are integrated with visual appraisal in the identification of body traits that will ultimately affect the market grades and economic value of live animals and their carcasses.

AVS 304 Evaluation of Dairy Products 2(1,2)S Emphasizes sensory evaluation of dairy products; discussion of basic principles of organoleptic evaluation, fundamental rules for scoring and grading dairy products; evaluation of all classes of dairy products based on established grades and score cards.

AVS 305 Meat Grading and Selection 2(1,2)S Classification, grading, and selection of beef, lamb, and pork carcasses and wholesale cuts and factors influencing quality and value are studied. Students are eligible to compete in intercollegiate meat-judging contests.

AVS 309 Principles of Equine Evaluation 2(1,3) Study of conformation as it relates to locomotion, soundness, and breed standards. Includes rules and regulations of performance events and appropriate management of these events. Considerable time is spent judging classes and delivering oral reasons.

AVS 310 Animal Disease and Sanitation 3(3,0)S Basic principles of animal health. Emphasizes disease prevention in beef cattle, dairy cattle, goats, horses, poultry, and swine. The most common and important diseases and zoonosis of farm animals are explained. *Preq:* AVS 202.

AVS 311 Dairy Cattle Selection 2(1,2)S Emphasis is on the selection of dairy cattle for profitable herd operations. Evaluation of herd classification, fitting, showing, and true types is made.

AVS 315 Animal Welfare 3(3,0) Discussion of past, present, and future human/animal interaction. Topics include wild animals, domestication, animal welfare organizations, animal rights organizations, welfare assessment, animal agriculture, animal research, and other current topics. *Preq:* Junior standing.

AVS 320 Veterinary and Medical Terminology 2(2,0) Promotes students' understanding and use of basic scientific and medical terminology and concepts, especially those of basic science, biology, anatomy, physiology, and medicine. *Preq:* BIOL 104.

AVS 323 Poultry and Poultry Products Evaluation 2(0,4) Selection of layers, broilers, and turkeys. Grading of poultry products according to USDA grade standards is also studied. Students are eligible to compete in intercollegiate poultry judging contests. May be repeated for a maximum of four credits.

AVS 330 Animal Pathology 3(3,0)F Acquaints students with animal pathology including cell injury, inflammation, neoplasia, immunologic disease, and pathology of various organ systems. *Preq:* AN PH 301 or consent of instructor.

AVS 353 Meats 2(2,0)S Study of the chemical and physical composition of meat, meat hygiene, nutritive value, curing, freezing, and meat by-products. *Preq:* AVS 108, 202.

AVS 354 Meats Laboratory 1(0,3) Selection and grading of meat animals and carcasses. Practical work in slaughtering of animals and in the cutting, curing, and freezing of meats. Emphasis is on the identification of wholesale and retail cuts. *Preq:* AVS 108, 202.

AVS 360 Internship 1-12(0,3-36) Off-campus, preplanned, supervised learning opportunity in an area related to animal and veterinary sciences. Students submit periodic written reports and a final written report. To be taken Pass/Fail only. *Preq:* Sophomore standing in Animal and Veterinary Sciences and consent of instructor coordinating internship.

AVS 370, H370 Principles of Animal Nutrition 3(3,0)S Familiarizes students with nutrients and feeds used in livestock and specialty animal production. Methods of evaluating common feedstuffs are covered along with a survey of the functioning of the various digestive systems. Practical aspect to feeding each species is covered. *Preq:* AVS 202, CH 102.

AVS 375, H375 Applied Animal Nutrition 3(2,2)S Students learn procedures for formulating diets that meet nutrient requirements of livestock and poultry, utilizing traditional mathematical approaches and computerized formulation. Computerized least-cost formulation of diets is covered along with familiarization with feeding systems and approaches. *Preq:* AVS 202; to be taken concurrently or following AVS 370.

AVS 385 Equine Behavior and Training 2(0,4) Basic understanding of horse psychology and how it can be modified. Students learn how to safely handle, train, and work with horses in-hand and under saddle. Includes preparation for such diverse events as sales and shows. *Preq:* AVS 108, 202.

AVS 390 Practicum 1-3(0,3-9) On-campus, preplanned, supervised learning experience in an area related to animal and veterinary sciences. Gives experience not covered in other classwork. May be repeated for a maximum of four credits. To be taken Pass/Fail only. *Preq:* Consent of instructor supervising practicum.

AVS 400, 600 Avian Physiology 2(2,0)S Even-numbered years. Detailed study of the structure and function of organ systems of avian species with emphasis on digestion and reproduction. Students are given an opportunity to study organ system(s) of their choice using quantitative physiological techniques. *Preq:* AVS 201, AN PH 301 or consent of instructor.

AVS 401, H401, 601 Beef Production 4(3,2)F Breeding, feeding, reproduction, and management of beef cattle are discussed. Emphasis is on production systems integrating disciplines of animal agriculture into management plans and alternatives. Practical applications of beef production and management practices are also presented. *Preq:* AVS 202, 370.

AVS 402, 602 Poultry Management 4(3,2)S Emphasizes management, decision making, and application of technology to the commercial production of poultry and poultry products.

AVS 403, 603 Laboratory Techniques 3(2,3)F Research and quality control techniques commonly used in dairy science and related agrisciences. *Preq:* CH 102.

AVS 404, 604 Dairy Cattle Feeding and Management 4(3,2)F Alternate years. Fundamental principles in the care, feeding, and management of dairy cattle of all ages. Topics include general consideration in selecting a breed and the individual cow, calf raising, growth and development of dairy heifers, care and maintenance of the milking herd, and feeding for milk production. *Preq:* AVS 202, 370.

AVS 405 Advanced Selection and Evaluation 2(0,4)F Special and advanced training in selection and evaluation of breeding, performance, and market animals or their products. Species used are beef and dairy cattle, sheep, swine, and horses. *Preq:* AVS 302 or 303 or 304 or 305, 309 or 311 and consent of instructor.

AVS 406 Seminars and Related Topics 2(3,0) Provides opportunity to prepare and deliver orally technical information not fully covered in classwork, to aid in résumé preparation, to introduce interviewing skills, and to acquaint students with industry expectations for Animal and Veterinary Sciences graduates. *Preq:* COMM 250.

AVS 407, 607 Equine Theriogenology 3(2,2)F Review of reproductive anatomy and physiology in the mare and stallion, induction of estrus and ovulation, practices for optimal reproductive efficiency, semen collection, preservation and transport, embryo transfer, regulatory aspects of reproduction by various breed registries, noninfectious and infectious diseases affecting reproduction, reproductive health management. *Preq:* AVS 453.

AVS 408, H408, 608 Pork Production 4(3,2)S Breeding, feeding, grading, marketing, and management of swine are studied. Practical applications from all phases of the production cycle are outlined in problem form to develop students' problem-solving abilities. *Preq:* AVS 202, 370.

AVS 409 Selected Topics 1-3(1-3,0) Topics of interest to students at the undergraduate, graduate, and professional levels. Provides experience with problems not covered in other courses or on thesis research. May be repeated for a maximum of six credits, but only if different topics are covered.

AVS 412, H412, 612 Horse Production 4(3,2)S Feeding, breeding, and management of the horse discussed in relation to health, genetics, reproduction, nutrition, and selection. *Preq:* AVS 202, 370.

AVS (BIOSC, MICRO) 414, H414, 614 Basic Immunology 4(3,3) See MICRO 414.

AVS 418, 618 Muscle Biology and Lean Meats 3(2,2) Biology of animal muscle, connective, fat, and bone tissue with laboratory emphasis on low-fat sausages and restructured, value-added meat products. *Preq:* AVS 202.

AVS 422 Special Problems 1-3(0,3-9) Laboratory, library, or field study of problems related to animal and veterinary sciences, emphasizing development and testing of hypothesis and reporting of results. May be repeated for a maximum of four credits. *Preq:* Junior standing and consent of instructor supervising study.

AVS 425, 625 Poultry Products Grading and Technology 3(2,3)S Odd-numbered years. Factors important in the quality of poultry products are considered. The effects of production, handling, packaging, and storage on consumer acceptability are discussed. Quality evaluation is considered from the standpoint of tenderness, flavor, microbiology, and USDA grades. *Preq:* AVS 108, 202.

AVS 430, 630 Dairy Processing I 4(3,3)F Alternate years. Processing and distribution of fluid milk and other dairy products with emphasis on composition, quality control, chemical microbiological, and public health aspects. *Preq:* BIOL 104, CH 102.

AVS 431, 631 Dairy Processing II 4(3,3)S Alternate years. Continuation of AVS 430, with emphasis on processing of cultured dairy products and frozen dairy products. Processing procedures, quality control, ingredients, formulations, and compositional and cultural characteristics of cultured and frozen dairy products are discussed. *Preq:* AVS 430.

AVS 451, 651 Poultry Nutrition 2(2,0)F Odd-numbered years. Nutrient requirements of chickens, turkeys, and game birds and methods of determining these requirements are discussed. Deficiencies and excesses of vitamins and minerals and the effects of naturally occurring toxins are considered. Hand formulation and linear programming are introduced.

AVS 452, 652 Poultry Nutrition Laboratory 1(0,3) Provides training in basic laboratory skills and familiarizes students with common laboratory methods used in poultry nutrition.

AVS 453, H453, 653 Animal Reproduction 3(2,2)S Reproductive physiology and endocrinology of mammals with emphasis on farm animals and frequent reference to reproduction in laboratory animals and humans. *Preq:* AN PH 301, AVS 202.

AVS 455, 655 Animal Reproductive Management 1(0,3)S Physiology and endocrinology of pregnant and nonpregnant cows are discussed. Emphasis is on methods of artificial insemination, pregnancy detection, and computer recordkeeping to achieve a high level of reproductive efficiency in cattle. *Preq:* AN PH 301, AVS 202; to be taken concurrently or following AVS 453.

AVS 458, 658 Avian Microbiology and Parasitology 3(3,0)F Even-numbered years. Agents causing poultry diseases; the diagnosis, prevention, and treatment of specific diseases and their economic and public health significance.

AVS 461, 661 Physiology of Lactation 2(2,0)S Anatomy and development of the mammary gland; physiological and biochemical regulation of mammary growth and milk secretion with emphasis on farm animals and reference to other mammals. *Preq:* AVS 202, BIOCH 305.

AVS 470, H470, 670 Animal Breeding 3(3,0)S Fundamental principles relating to the breeding and improvement of livestock including variation, heredity, selection, linebreeding, inbreeding, crossbreeding, and other related subjects. *Preq:* AVS 202 or consent of instructor.

AVS (BIOSC) 480, 680 Vertebrate Endocrinology 3(3,0) See BIOSC 480.

ANIMAL PHYSIOLOGY

(See also courses listed under *Animal and Veterinary Sciences and Endontology.*)

Professors: G. P. Birrenkott, Jr., A. B. Bodine II, T. Gimenez, T.R. Scott, J.R. Tomasso, Jr.; *Associate Professor:* J. M. Colacino; *Adjunct Professor:* W.R. Boone; *Adjunct Associate Professor:* S. Valentini; *Adjunct Assistant Professors:* H. L. Higdon III, J. T. Wyffels

AN PH 301 Physiology and Anatomy of Domestic Animals 4(3,3)F Physiology and associated anatomy of the body systems, including nervous, skeletal, muscular, respiratory, digestive, circulatory, urinary, reproductive, and endocrine systems. Designed primarily for students in Animal and Veterinary Sciences. *Preq:* BIOL 104 or 111.

AN PH 401 Selected Topics 1-3(1-3,0) Comprehensive study of selected topics of interest in animal physiology not covered in other courses. May be repeated once for a maximum of six credits, but only if different topics are covered.

ANTHROPOLOGY

Professor: J. M. Coggeshall; *Assistant Professors:* E. L. Williams, Y. Zhang

ANTH 201 Introduction to Anthropology 3(3,0) Cross-cultural examinations of contemporary human society; physical evolution of humans; development of societies in the archaeological record; environmental impact of human societies today.

ANTH 301 Cultural Anthropology 3(3,0) Exploration of human cultural diversity and current global issues. Examination of food production and economic distribution, political organization, marriage and family, and religious systems in contemporary cultures. *Preq:* ANTH 201 or consent of instructor.

ANTH 320 North American Indian Cultures 3(3,0) Discussion of the prehistory of Native peoples, their cultural diversity at European contact, and the history and impact of that contact. Contemporary issues facing Native Americans are also examined. *Preq:* ANTH 201 or consent of instructor.

ANTH 331 Introduction to Archaeology 3(3,0) Introduction to archaeology offering insights into the past by recovering and interpreting material remains. Methods and theories of anthropological archaeology are examined, particularly cultural history and ways in which human societies have evolved and become more complex over time.

ANTH 351 Physical Anthropology 3(3,0) Study of humans as biological organisms. Examines human evolution, primate social behavior, human physiological variations and disease resistance, and human skeletal anatomy and forensics.

ANTH 403, 603 Qualitative Methods 3(3,0) Methods and techniques of qualitative field research, including participant observation, ethnographic interviewing, data analysis, and report writing. *Preq:* ANTH 201 or consent of instructor.

ANTH (JAPN) 417 Japanese Culture and Society 3(3,0) See JAPN 417.

ANTH (CHIN) 418 Chinese Culture and Society 3(3,0) See CHIN 418.

ANTH 495 Field Studies 1-6(1-2,2-12) Group field project in settings selected by the instructor to provide students with a variety of exposures to various cultural contexts. Archaeological digs are included. Project progress and student interpretations of findings are monitored by periodic group meetings and shared experiences. May be repeated for a maximum of six credits. *Preq:* ANTH 403 or consent of instructor.

ANTH 498 Independent Study 3(1,6) Individual readings or projects in anthropological areas not covered in other courses. *Preq:* ANTH 201.

ARCHITECTURE

Professors: J. F. Barker, *President*; J. R. Caban, *Chair*; L. G. Craig, M. A. Davis, R. J. Hogan, Y. Kishimoto, R. B. Norman; *Visiting McMahan Associate Professor:* F. K. Trubiano; *Visiting Mickel Associate Professor:* F. K. Mooney, Sr.; *Associate Professors:* D. J. Allison, K. E. Green, H. C. Harriotts, N. J. Hurt, R. J. Miller (Charleston), G. W. Patterson, R. T. Silance; *Assistant Professors:* D. G. Battisto, P. Del Real, J. A. Erdman, D. A. Hecker, R. T. Huff (Charleston), R. L. Rael, M. L. Skinner; *Lecturers:* J. C. Allison (Charleston), R. A. Bruhns, G. V. Epolito, P. K. Huggins, Jr. (Charleston), A. H. Jacques, A. K. Jennings (Charleston), C. B. Mills, Y. Oka, V. M. San Fratello

ARCH 151 Collaborative Studio I 4(2,6) [C.1, O.1] Introduction to principles of architectural design. Collaborative studio offering instruction in the specific skills of formal composition, visual communication, oral presentation, and computer literacy. Critical studies of canonical texts and buildings serve as the primary vehicle for design discussions.

ARCH 152 Collaborative Studio II 3(1,6) [O.1] Continuation of ARCH 151. Introduction to an elemental vocabulary of architecture within basic spatial design problems, with emphasis on visual communications skills, oral presentations of work, and analysis and discussion of design issues through critical readings of canonical texts and buildings. *Preq:* ARCH 151.

ARCH 201 Introduction to Architecture 3(3,0) Examines basic concepts of architectural design using historic and contemporary examples. Principles of design, programmatic concerns, design documents, and construction are discussed in the context of the practice of architecture.

ARCH 251 Collaborative Studio III 4(1,9) [C,1, O,1] Architectural analysis and design problems focusing on understanding the context of architecture. Specific investigation of the relationship between buildings and the cityscape and landscape. Instruction on visual communications skills, computer modeling, and oral presentation techniques support design discussions. *Preq:* ARCH 152.

ARCH 252 Collaborative Studio IV 4(1,9) [C,1] Continuation of ARCH 251. Architectural design problems with a focus on fundamental organizational, spatial, structural, and constructive principles and their relationship to contextual situations. Instruction on visual communication skills and computer rendering support the design discussions. *Preq:* ARCH 251.

ARCH 351 Architecture Studio I 6(1,11) [W,1] Synthesizes architectural ideas into form; visual, oral, and written communications; and design projects of increasing scale and complexity. Developing the ability to clearly communicate one's thoughts into architectural form is the ultimate objective. *Preq:* ARCH 252.

ARCH 352 Architecture Studio II 6(1,11) [W,1] Continuation of ARCH 351. Studio dealing with urban-based institution design. Housing issues are also explored. Visual, oral, and written communications are stressed within an environment that strives for synthesis of ideas and architectural form. *Preq:* ARCH 351.

ARCH 403, 603 The Modern Architectural Movement 3(3,0) Seminar in the analysis and criticism of architectural and town building works. Course sequence includes historic and contemporary examples, literary searches, field trips, essays, and oral reports. *Preq:* Senior standing or consent of instructor.

ARCH 404, 604 Current Directions in Architecture 3(3,0) Critical analysis of the development and current directions of modern movements in architecture. *Preq:* Senior standing or consent of instructor.

ARCH 405, 605 American Architectural Styles 1650-1950 3(3,0) Survey of American architectural styles and of the architects responsible for them, from the Colonial period to our recent past. Considerable emphasis is placed on identifying those architectural elements which serve as clues in determining a building's architectural style.

ARCH 412, 612 Architectural History Research 3(3,0) Directed investigations related to the art and architectural history of Europe. May be repeated for a maximum of six credits. *Preq:* Junior standing or consent of instructor.

ARCH 414, 614 Design Seminar 3(3,0) Exploration of topical issues in architecture, art, construction, and planning. May be repeated for a maximum of six credits. *Preq:* Junior standing or consent of instructor.

ARCH 415, 615 Field Sketching 3(0,6) Study of media and techniques for expression, representation, and visual analysis through freehand and perspective field drawing of the built and natural environment. *Preq:* Junior standing in School of Design and Building or consent of instructor.

ARCH 416, 616 Field Studies in Architecture and Related Arts 3(0,9) Documentation and analysis of architectural structures observed during European travels in graphic and written form. May be repeated for a maximum of six credits. *Preq:* Junior standing or consent of instructor.

ARCH 421 Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental and technological considerations in architecture and the building industry. *Preq:* Senior standing or consent of instructor.

ARCH 422 New Directions Seminar 3(3,0) Exploration into careers which relate directly (i.e., construction law) or indirectly (i.e., public relations) to the making of our built environment.

ARCH 424, 624 Product Design 3(0,9) Furniture and product system design with emphasis on ergonomics and the relationship of form and materials. *Preq:* Senior standing and consent of instructor.

ARCH 425, 625 Energy in Architecture 3(3,0) Climate design methodology and its influence on building energy patterns and architectural form. *Preq:* Senior standing and consent of instructor.

ARCH 426, 626 Architectural Color Graphics 3(3,0) Architectural color graphics by computer. Theories of color classification and interaction; application of color theories to art and architecture. *Preq:* Consent of instructor.

ARCH 427, 627 Advanced Color Graphics 3(3,0) Theories of color classification and interaction; three-dimensional color modeling by computer; advanced application of color theories to art and architecture. *Preq:* ARCH 426 or consent of instructor.

ARCH 428, 628 Computer-Aided Design 3(2,3) Introduction to the concepts, skills, and applications of computer-aided design as they relate to the practice of architecture. *Preq:* Senior standing or consent of instructor.

ARCH 429, 629 Architectural Graphics 3(3,0) Provides students with an understanding of the concepts, skills, techniques, and strategies of visual presentation/graphics as they relate to the design professions—architects/landscape architects. *Preq:* Junior standing or consent of instructor.

ARCH 430, 630 Theories and Philosophies of Technology and Architecture 3(3,0) Theoretical and practical examination of technology and architecture from pre-modern and modern viewpoints to study its nonneutral role in shaping and reflecting knowledge, beliefs, and actions within a cultural context.

ARCH 431, 631 Virtual Reality in Architecture 3(3,0) Introduction and exploration of the theories and concepts of virtual reality and their use in modeling three dimensional spaces. Instruction in computer modeling, lighting, and texture mapping is offered. Projects focus on the creation and presentation of a virtual environment. *Preq:* Junior standing or consent of instructor.

ARCH 440 New York Field Study 3(3,0) Study of architecture, art, planning, and urban design of New York. Two weeks of residence are required with scheduled field trips to relevant sites in all five boroughs, with counseling to determine research interests. Guidance is provided to resources in the city. A final report is required.

ARCH 451 Architecture Studio III 6(1,11) [W,1] Continuation of ARCH 352. Advanced architectural issues of program and theory, synthesis of ideas, and self-criticism. *Preq:* ARCH 352.

ARCH 452 Architecture Studio IV 6(0,12) Continuation of ARCH 451. Self-directed design studio. Independent study in which students set the parameters of design issues and complete the studio sequence. *Preq:* ARCH 451.

ARCH 485, 685 Health Care Facilities 3(3,0) Introduces concepts, organization, and direction of health and health-care services within the context of health-care delivery systems. Special emphasis is placed on mental and physical health-care facilities concepts. *Preq:* Consent of instructor.

ARCH 488, 688 Health Care Facilities Programming 3(3,0) Seminar on recent research and innovations in health-care facilities programming and original investigation of assigned programming problems. *Preq:* Consent of instructor.

ARCH 490, H490 Directed Studies 1-5 Comprehensive studies and research of special topics not covered in other courses. Emphasis is on field studies, research activities, and current developments in architecture. May be repeated for a maximum of ten credits. *Preq:* Consent of department chair.

ARCH 499, H499 Selected Topics in Architecture 1-3(1-3,0) Study of selected topics in architecture. May be repeated for a maximum of nine credits, but only if different topics are covered. *Preq:* Junior standing or consent of instructor.

ARCH 557 Architecture Studio 6(0,18) City planning design and the development of complex building solutions.

ART

Professors: S. A. Cross, T. W. Dimond, W. W. Lew, M. V. Vatalaro, *Interim Chair*; S. T. Wang, *Associate Professor*; D. M. Detricch, A. V. Feeser, J. B. Leblanc; *Assistant Professors:* H. J. Jensen, K. Kourelis, T. Ueshina; *Lecturers:* T. B. Linville, J. R. Manson, C. B. Smith, B. A. Roberts, D. C. Woodward-Derrich

ART 103 Visual Arts Studio 3(0,6) Studio projects in basic visual elements and principles. The development of creative design process, visual organization, and design skills are introduced as a foundation for further study in visual arts.

ART 151 Foundations in 2D Art 3(0,6) Intensive introduction to the visual arts and design fundamentals including the exploration of the history and practical applications of the elements and principles of design as they relate to two-dimensional art work. *Preq:* Visual Arts major.

ART 152 Foundations in 3D Art 3(0,6) Intensive introduction to the visual arts and design fundamentals, including the exploration of the history and practical applications of elements and principles of design as they relate to three-dimensional art work. *Preq:* Visual Arts major.

ART 153 Orientation to Visual Arts I 1(1,0) Introduction to visual arts profession focusing on issues related to various career opportunities, creativity, problem solving methodologies, and current thinking in contemporary art. *Preq:* Visual Arts major.

ART 154 Orientation to Visual Arts II 1(1,0) Introduction of professional practices related to the visual arts. Addresses issues related to the development and documentation of professional activities in the various studio disciplines as well as health and safety concerns for the studio artist. *Preq:* Visual Arts major.

ART 205 Beginning Drawing 3(0,6) Study of drawing based on the premise that drawing is a foundation discipline in the visual arts. Basic materials and approaches associated with drawing are studied and applied through studio practice, augmented by critiques, demonstrations, and lectures. *Preq:* ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 207 Beginning Painting 3(0,6) Introduction to basic materials, methods, and techniques of painting. Primary medium used is acrylic, and other painting media may also be introduced. Emphasis is on basic skills in painting plus individual creative development. *Preq:* ART 151, 153, 205 (Visual Arts majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 209 Beginning Sculpture 3(0,6) Studio course investigating the meaning of sculpture through traditional and nontraditional approaches. Establishes a working knowledge of material and process in several media. Personal expression is encouraged and enhanced by employment of problem-solving techniques. Static, temporal, installation, and site specific sculpture is explored. *Preq:* ART 151, 152, 153, 154, 205 (Visual Arts majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 211 Beginning Printmaking 3(0,6) Studio course introducing basic techniques of relief printing, intaglio, lithography, silkscreen, and papermaking. Each semester concentrates on two or three of these techniques. Coursework integrates print-making processes and creativity. *Preq:* ART 151, 152, 153, 154, 205 (Visual Arts majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 213 Beginning Photography 3(0,6) Introduction to the use of photography as an art medium. Lectures and studio work cover the utilization of the camera, processing and printing in black and white, with emphasis on perception and creative expression. *Preq:* ART 151, 152, 153, 154, 205 (Visual Arts majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 215 Beginning Graphic Design 3(0,6) Introduction to fundamental techniques, concepts, and principles of visual communication. Through a series of projects and studio work, students explore techniques of communication through the use of type design, typography, photography, illustration, symbolism, and product design. Individual creative development is stressed. *Preq:* ART 151, 152, 153, 154, 205 (Visual Arts majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 217 Beginning Ceramics 3(0,6) Basic studio course introducing ceramic arts through its various processes and techniques. Hand building methods as well as throwing on the potter's wheel are developed. Weekly projects emphasize imagination, self-expression, and skill development. Ceramic history is introduced through slide lectures. *Preq:* ART 151, 152, 153, 154, 205 (Visual Arts majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 219 Beginning Papermaking 3(0,6) Explores paper, not just as a surface to receive an image, but as a material capable of being an artistic expression in and of itself. *Preq:* ART 151, 152, 153, 154, 205 (Visual Arts majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 223 Woodworking Studio 3(0,6) Introduces woodworking explorations in sculpture and furniture design with emphasis on technical understanding and creative application of woodworking processes and methodologies. Students experiment with wood as a vehicle for personal expression and thematic development and conduct research on the historical impact of woodworking in the visual arts. *Preq:* ART 151, ART 152 or ARCH 152, or LARCH 152, or consent of instructor.

ART 305 Drawing 3(0,6) Study of human figure drawing with primary emphasis on drawing from live models. Student's drawing skills and fundamental understanding of the structure and form of the human figure are reviewed through studio practice, augmented by critiques, demonstrations, and lectures. *Preq:* ART 205 or consent of instructor.

ART 307 Painting 3(0,6) Continuation of ART 209 with increased emphasis on personal expression and growth in technical competence. Some study of painting history is included in studio activity. *Preq:* ART 207 or consent of instructor.

ART 308 Painting Research I 1-3(0,2-6) Continuation of ART 307. Technical and conceptual research in painting to further develop self-expression. Special projects are developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 307 or consent of instructor.

ART 309 Sculpture 3(0,6) Continuation of ART 209 with increased emphasis on personal expression and content of work. Further exploration of materials and processes including an introduction to foundry casting and advanced welding techniques. Individual investigation into current and historical aspects of sculpture is required. *Preq:* ART 209 or consent of instructor.

ART 310 Sculpture Research I 1-3(0,2-6) Continuation of ART 309. Technical and conceptual research in sculpture to further develop self-expression. Special projects are developed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 309 or consent of instructor.

ART 311 Printmaking 3(0,6) Continuation of processes in beginning printmaking with emphasis on expanding the range and depth of technique. The relationship of technique and process to creative idea development is emphasized. *Preq:* ART 211 or consent of instructor.

ART 312 Printmaking Research I 1-3(0,2-6) Continuation of ART 311. Technical and conceptual research in printmaking to develop self-expression. Special projects are constructed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 311 or consent of instructor.

ART 313 Photography 3(0,6) Continuation of ART 213. Advanced techniques and more diverse types of film and paper are used in making images of personal and expressive nature. The design and construction of a view camera, printing in color, and multiple imagery may also be included. *Preq:* ART 213 or consent of instructor.

ART 314 Photography Research I 1-3(0,2-6) Continuation of ART 313. Technical and conceptual research to develop personal and expressive work in photography. Projects are chosen in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 313 or consent of instructor.

ART 315 Graphic Design 3(0,6) Continuation of concepts and techniques introduced in ART 215 with emphasis on more applied projects. Individual creative solutions are emphasized. *Preq:* ART 215 or consent of instructor.

ART 317 Ceramic Arts 3(0,6) Continuation of skill development leading to more challenging projects and independent efforts. Further exposure to ceramic history and ceramic technology is presented. *Preq:* ART 217 or consent of instructor.

ART 318 Ceramics Research I 1-3(0,2-6) Continuation of ART 317. Technical and conceptual research in ceramics for the purpose of self-expression. Projects are constructed in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 317 or consent of instructor.

ART 321 Art with the Computer 3(0,6) Studio course using the microcomputer as an art medium. Studies in imaging systems, with emphasis on the creative use of the medium for artistic expression. *Preq:* ART 151, 152, 153, 154, 205 (Visual Arts majors); ART 103 (non-Art majors); ARCH 152 (Architecture majors); LARCH 152 (Landscape Architecture majors); or consent of instructor.

ART 322 Art with Computer Research I 1-3(0,2-6) Continuation of ART 321. Technical and conceptual research to develop personal and expressive work in computer imaging. Projects are chosen in consultation with instructor. May be repeated for a maximum of five credits. *Preq:* ART 321 or consent of instructor.

ART 405, 605 Advanced Drawing 3(0,6)

Advanced level studies of drawing which explore the synthesis of refined drawing skills and philosophies of art. Students' understanding of drawing as a form of art is developed through studio practice augmented by critiques, demonstrations, lectures, field trips, and independent research. *Prq:* ART 305 or consent of instructor.

ART 407, 607 Advanced Painting 3(0,6)

Advanced studio course in painting. Students select painting media and develop a strong direction based on prior painting experience. Study of contemporary painters and directions is included. *Prq:* ART 307 or consent of instructor.

ART 409, 609 Advanced Sculpture 3(0,6)

Intensive independent studio concentration to further develop personal direction and content. Continued investigation of sculptural context, materials and processes, and relative historical research is emphasized. *Prq:* ART 309 or consent of instructor.

ART 411, 611 Advanced Printmaking 3(0,6)

Culmination of process, techniques, and individual development. Students are expected to have mastered process and technique for the benefit of the image produced. Creativity and self-expression are highly emphasized as students select a process for concentrated study. *Prq:* ART 311 or consent of instructor.

ART 413, 613 Advanced Photography 3(0,6)

Continuation of ART 313. Advanced problems in photography. *Prq:* ART 313 or consent of instructor.

ART 415 Advanced Graphic Design 3(0,6)

Continuation of ART 315. Personal expression through communication techniques is further explored. Individual projects are emphasized. *Prq:* ART 315 or consent of instructor.

ART 417, 617 Advanced Ceramic Arts 3(0,6)

Students are directed toward further development of ideas and skills. Glaze calculation and firing processes are incorporated to allow for a dynamic integration of form and ideas. *Prq:* ART 317 or consent of instructor.

ART 418 Ceramics Research II 1-3(0,2-6)

Continuation of ART 417. Technical and conceptual research in ceramics for the purpose of self-expression. Projects are chosen in consultation with instructor. May be repeated for a maximum of five credits. *Prq:* ART 417 or consent of instructor.

ART 420, 620 Selected Topics in Art 1-3(0,6-9)

Intense course in studio art. May be repeated for a maximum of six credits, but only if different topics are covered. *Prq:* Senior standing or consent of instructor.

ART 471 Bachelor of Fine Arts Senior Studio I 5(0,15)

Individual studio project directed by an instructor and determined by the student in consultation with the instructor. Usually focuses on a particular studio area, concept, or theme. May be repeated for a maximum of ten credits. *Prq:* Senior standing and completion of 300/400 sequence in the studio area in which students choose to complete senior studio, minimum grade-point ratio of 3.0 in focus studio area.

ART 472 Bachelor of Fine Arts Senior Studio II 5(0,15)

Individual studio project directed by an instructor and determined by the student in con-

sultation with the instructor. Usually focuses upon a particular studio area, concept, or theme. *Prq:* ART 471 with a B or better.

ART 490, H490, 690 Directed Studies 1-5(0,2-10)

Study of areas in the visual arts not included in other courses or additional advanced work. Must be arranged with a specific instructor prior to registration. May be repeated for a maximum of 18 credits. *Prq:* Consent of instructor.

ART AND ARCHITECTURAL HISTORY

Professor: W. W. Lew; *Associate Professors:* A. V. Feeser, J. B. LeBlanc; *Assistant Professor:* K. Kourelis

A A H 101, H101 Survey of Art and Architectural History I 3(3,0)

Comprehensive survey of art and architectural history of Western heritage as well as significant coverage of Asian, African, Native American, and South American art. The arts are studied within the contexts of history, geography, politics, religion, and culture. Survey includes Ancient through Gothic.

A A H 102, H102 Survey of Art and Architectural History II 3(3,0)

Survey of Renaissance, Baroque, and Neoclassical art and architecture. Introduction to the Modern Movement in Europe and America. *Prq:* A A H 101.

A A H 203, H203 History and Theory of Architecture I 3(3,0)

First of a two-semester sequence of special topics and issues in the history of architecture. Emphasis is on architectural theory and practice in the past and present. Analysis of differing approaches to history: chronological, typological, thematic, phenomenological. *Prq:* A A H 102.

A A H 204, H204 History and Theory of Architecture II 3(3,0)

Second of a two-semester sequence on special topics and issues in the history of architecture. Emphasis is on typologies of the house, governmental buildings, and sacred architecture. New directions in architectural historiography. *Prq:* A A H 203.

A A H 205, H205 History and Theory of Art I 3(3,0)

First of a two-semester sequence on special topics and issues in the history of art. Emphasis is on stylistic developments and specific art movements. Analysis of art within the larger context of social, political, and religious history. Examination of art techniques and theory as they have developed. *Prq:* A A H 102.

A A H 206, H206 History and Theory of Art II 3(3,0)

Second of a two-semester sequence on special topics and issues in the history of art. Continued emphasis on stylistic developments and art movements, with specific attention directed toward post-Renaissance art. Analysis of the influence of past history on modern. *Prq:* A A H 205.

A A H 210, H210 Introduction to Art and Architecture 3(3,0)

One-semester lecture survey that introduces to the nonmajor an overview of art and architecture from different time periods and cultures. Students are encouraged to appreciate the contribution to art made by the great masters and to discern different styles, art techniques, and creative traditions.

A A H 305 Contemporary Art History 3(3,0)

Study of contemporary art from World War II to the present, exploring forces that have shaped various movements and directions. *Prq:* A A H 206.

A A H H330 Honors Colloquium 3

Undergraduate honors colloquium with emphasis on interdisciplinary interpretations. An integration of art, architecture, landscape, and city planning. *Prq:* A A H 204 or 206 or consent of instructor.

A A H 391 Italian Studies Abroad I 3-6(3-6,0)

On-site exposure of specific works of art and architectural monuments in Italy, coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short stay in Italy or during the summer with an extended foreign experience. May not be taken Pass/Fail. *Prq:* A A H 204 or 206 or consent of instructor.

A A H 392 British Studies Abroad I 3(3,0)

On-site exposure to specific works of art and architectural monuments in Great Britain, coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short stay in Britain or during the summer with an extended foreign experience. May not be taken Pass/Fail. *Prq:* A A H 204 or 206 or consent of instructor.

A A H 393 French Visual Studies Abroad I 3(3,0)

On-site exposure to specific works of art and architectural monuments in France, coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short stay in France or during the summer with an extended foreign experience. May not be taken Pass/Fail. *Prq:* A A H 204 or 206 or consent of instructor.

A A H 394 Northern European Visual Studies Abroad I 3(3,0)

On-site exposure to art and architecture in Northern European countries such as Belgium, Germany, and Holland coupled with lectures and study problems. May be taught alternately as a compact course during academic year with short stay in Northern Europe or during summer with extended foreign experience. May not be taken Pass/Fail. *Prq:* A A H 204 or 206 or consent of instructor.

A A H 395 Special Topics in Visual Studies Abroad I 3(3,0)

On-site exposure to art and architecture in foreign countries, coupled with lectures and study problems. Different countries may be selected for study at faculty discretion. May be taught as a compact course during academic year with short stay in foreign country or during summer with extended foreign experience. May not be taken Pass/Fail. *Prq:* A A H 204 or 206 or consent of instructor.

A A H 396 Special Topics in Visual American Studies I 3(3,0)

On-site exposure to specific works of art and architectural monuments throughout the U.S., coupled with lectures and study problems. May be taught alternately as a compact short course during the academic year with a short trip to areas of interest or during the summer with extended travel. May not be taken Pass/Fail. *Prq:* A A H 204 or 206 or consent of instructor.

- A A H 411, 611 Directed Research in Art History II 3(3,0)** Comprehensive studies and research of special topics not covered in other courses. Emphasis is on field studies, research activities, and current developments in art history.
- A A H 412, 612 Directed Research in Art History II 3(3,0)** Continuation of A A H 411.
- A A H (LARCH) 416 History of Landscape Architecture 3(3,0)** Planetary survey of notable examples of mankind's constant efforts to arrange and bring order to his environment by design on the land. *Preq:* Junior standing or consent of instructor.
- A A H 423, 623 Studies in the Art and Architecture of the Renaissance I 3(3,0)** Consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th–18th centuries), with a study in depth of selected examples from the period. *Preq:* A A H 204 or 206 or consent of instructor.
- A A H 424, 624 Studies in the Art and Architecture of the Renaissance II 3(3,0)** Consideration of the visual arts and architectural monuments of the Renaissance (Western Europe from the 15th–18th centuries), with a study in depth of selected examples from the period. *Preq:* A A H 423.
- A A H 428, 628 Nineteenth Century Visual Arts 3(3,0)** Consideration of the visual arts of the 19th century: painting, sculpture, printmaking, ceramics, and so forth, in relation to the factors that have influenced the artist and the consequence on society. *Preq:* A A H 427.
- A A H 429 Studies in the Art and Architecture of India and the Far East 3(3,0)** Consideration of the visual arts and architectural monuments of India and the Far East, with a study in depth of selected examples from the period. *Preq:* A A H 204 or 206 or consent of instructor.
- A A H 430, 630 Twentieth Century Art I 3(3,0)** Acquaints students with the major artists' monuments and issues of the Modern period in art. Through lecture/discussions and the reading of primary sources, course places the major modern movements in the context of the period (1860s–1945). *Preq:* Consent of instructor.
- A A H 432, 632 Twentieth Century Art II 3(3,0)** Overview of trends in art and architecture since World War II. Specific artists, artworks, and movements are presented in a socio/historic context with specific emphasis on the transition from a late-modernist to a post-modern perspective. *Preq:* Consent of instructor.
- A A H (PHIL) 433, 633 Issues in Contemporary Art and Philosophy 3(3,0)** See PHIL 433.
- A A H 435, 635 Studies in Precolumbian Art and Architecture 3(3,0)** Familiarizes students with the art and architecture of the Western Hemisphere's Precolumbian culture in Mexico, Central, and South America. *Preq:* A A H 102 or 210 or consent of instructor.

ASTRONOMY

Professors: D. D. Clayton, M. D. Leising, B. S. Meyer; *Associate Professors:* P. J. Flower, D. H. Hartmann, J. C. King

- ASTR 101 Solar System Astronomy 3(3,0)** Descriptive survey of the universe, with emphasis on basic physical concepts and the objects in our solar system. Related topics of current interest are included. For nonscience majors. May not be taken by students who have completed ASTR 301.
- ASTR 102 Stellar Astronomy 3(3,0)** Descriptive survey of the universe, with emphasis on basic physical concepts and galactic and extragalactic objects. Related topics of current interest are included. For nonscience majors. May not be taken by students who have completed ASTR 302.
- ASTR 103 Solar System Astronomy Laboratory 1(0,2)** Optional laboratory to accompany ASTR 101. Demonstrations, laboratory exercises, and planetary visits supplement the lecture course. *Coreq:* ASTR 101.
- ASTR 104 Stellar Astronomy Laboratory 1(0,2)** Optional laboratory to accompany ASTR 102. Demonstrations, laboratory exercises, and planetary visits supplement the lecture course. *Coreq:* ASTR 102.
- ASTR (GEOL) 220 Planetary Science 3(3,0)** See GEOL 220.
- ASTR 302 Stellar Astrophysics 3(3,0)** Study of the basic physical concepts necessary for understanding the sun, other stars, and their evolution. Topics include star formation, stellar structure and evolution, binary stars, and observational techniques. *Preq:* PHYS 221 or consent of instructor.
- ASTR 303 Galactic Astrophysics 3(3,0)** Study of basic physical concepts necessary for understanding the structure of the galaxy, the motions of the stars within it, the nature of the interstellar matter, other galaxies, the large-scale structure of the universe, and the origin of the solar system. *Preq:* PHYS 221 or consent of instructor.
- ASTR 475 Selected Topics in Astrophysics I 3(0,3,0-9)** Comprehensive study of an area of astrophysics. Topics may include nucleosynthesis and stellar evolution, extragalactic distance scale, structure and evolution of galaxies, and large-scale structure of the universe. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* ASTR 302 or consent of instructor.

ATHLETIC LEADERSHIP

- A L 349 Principles of Coaching 3(3,0)** Investigation into the scientific basis of the coaching profession, middle and high school levels. Topics include developing a coaching philosophy, sport psychology, sport pedagogy, sport physiology, athletic administration, and risk management. Current issues regarding sportsmanship, gender equity compliance, and cultural diversity are researched and synthesized. *Preq:* Athletic Leadership minor or consent of Athletic Leadership coordinator.
- A L 350 Scientific Basis of Coaching I: Exercise Physiology 3(3,0)** Increases understanding of basic scientific information concerning athletic performance by using the conceptual approach. In-depth investigation into the physiological principles that can enhance athletic performance is the primary focus. Phases of physical training as well as comprehensive evaluative techniques are included. *Preq:* A L 349 or consent of Athletic Leadership coordinator.
- A L 352 Scientific Basis of Coaching II: Kinesiology 3(3,0)** Increases understanding of basic scientific information concerning athletic movement by utilizing the conceptual approach. Deals with the basic laws of human motion necessary in evaluation of athletic movement, utilizing joint structure and anatomic landmarks as a basis for motion. *Preq:* A L 349.
- A L 353 Theory of Prevention and Treatment of Athletic Injuries 3(2,3)** Increases understanding of principles involved in the prevention and treatment of athletic injuries. Deals with basic anatomy, first aid, and diagnostic techniques necessary for the understanding of basic athletic training procedures. *Preq:* A L 349 or consent of Athletic Leadership coordinator.
- A L 361 Administration and Organization of Athletic Programs 3(3,0)** Study of modern techniques and practices used in administering athletic programs. Major emphasis areas such as practice and game organization, purchase and care of equipment, budget and finances, public relations, and legal liability in athletic programs are presented. *Preq:* A L 349 or consent of Athletic Leadership coordinator.
- A L 362 Psychology of Coaching 3(3,0)** Study of psychological techniques utilized to promote maximum athletic performance. Areas of emphasis include motivation, coaching philosophy, athletic personality, mental preparation, and goal-oriented behavior. *Preq:* A L 349 or consent of Athletic Leadership coordinator.
- A L 371 Coaching Baseball 1(0,3)** Increases understanding of basic technical and practical information concerning the coaching of baseball by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* A L 349 or consent of Athletic Leadership coordinator.
- A L 372 Coaching Basketball 1(0,3)** Increases understanding of basic technical and practical information concerning the coaching of basketball by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* A L 349 or consent of Athletic Leadership coordinator.
- A L 373 Coaching Cross Country 1(0,3)** Increases understanding of technical and practical information concerning the coaching of cross country by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* A L 349 or consent of Athletic Leadership coordinator.

A L 374 Coaching Football 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of football by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* A L 349 or consent of Athletic Leadership coordinator.

A L 375 Coaching Soccer 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of soccer by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* A L 349 or consent of Athletic Leadership coordinator.

A L 376 Coaching Strength and Conditioning 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of strength and conditioning by utilizing the conceptual approach. Students study basic principles of coaching, training programs, and equipment appraisal as a means to improve athletic performance. Total program development is also covered as it pertains to specific levels of competition. *Preq:* A L 349 or consent of Athletic Leadership coordinator.

A L 377 Coaching Track and Field 1(0,3) Increases understanding of basic technical and practical information concerning the coaching of track and field by utilizing the conceptual approach. Students study basic principles of coaching, competitive organization, and proper technical skills needed to improve athletic performances. Total program development is also covered as it pertains to specific levels of competition. *Preq:* A L 349 or consent of Athletic Leadership coordinator.

A L 453, 653 Athletic Injuries: Prevention, Assessment and Rehabilitation 3(3,0) Gives students an understanding of prevention, treatment, and rehabilitation procedures of injured athletes. *Preq:* A L 349.

BIOCHEMISTRY

Professors: A. G. Abbott, R. H. Hilderman, Chair; G. L. Powell; *Associate Professor:* W. R. Marcotte, Jr.; *Assistant Professors:* W. Cao, F. C. Chen, J. K. Frugoli, D. S. Main, B. D. Moore, J. C. Morris, K. S. Smith, J. P. Tomkins

BIOCH 301 Molecular Biochemistry 3(3,0) Introduction to the nature, production, and replication of biological structure at the molecular level and its relation to function. *Preq:* Organic Chemistry.

BIOCH 302 Molecular Biochemistry Laboratory 1(0,3) Laboratory to accompany BIOCH 301. Introduction to fundamental laboratory techniques in biochemistry and molecular biology and a demonstration of some of the fundamental principles of molecular biology discussed in BIOCH 301. *Preq:* Organic Chemistry. *Coreq:* BIOCH 301.

BIOCH 305 Essential Elements of Biochemistry 3(3,0) Introduction to structure, synthesis, metabolism and function of biomolecules in living organisms. *Preq:* CH 201 or equivalent.

BIOCH 306 Essential Elements of Biochemistry Laboratory 1(0,3) Introduces students to fundamental techniques associated with tissue extraction and analysis of biomolecules. Students learn both principles and practical applications. *Preq:* or *Coreq:* BIOCH 305.

BIOCH 406, 606 Physiological Chemistry 3(3,0) Chemical basis of the mammalian physiological processes of muscle contraction, nerve function, respiration, kidney function, and blood homeostasis is studied. Composition of specialized tissue such as muscle, nerve, blood, and bone and regulation of water, electrolytes, and acid-base balance are discussed. *Preq:* BIOCH 305 or Organic Chemistry.

BIOCH 423, 623 Principles of Biochemistry 3(3,0) Study of the chemistry of amino acids, monosaccharides, fatty acids, purines, pyrimidines, and associated compounds leads to an understanding of their properties and the relationship between structure and function that makes them important in biological processes. The use of modern techniques is stressed. *Preq:* CH 224 or equivalent.

BIOCH 431, H431, 631 Physical Approach to Biochemistry 3(3,0) Study of chemical and physical properties of amino acids, lipids, nucleic acids, sugars, and their biopolymers. Physical and mathematical analyses are correlated with biological structure and function. *Preq:* BIOCH 301 with a C or better or consent of instructor. *Coreq:* Physical Chemistry.

BIOCH 432, H432, 632 Biochemistry of Metabolism 3(3,0) Study of the central pathway of carbohydrate, lipid, and nucleotide metabolism. Bioenergetics, limiting reactions, and the regulation and integration of the metabolic pathways are emphasized. *Preq:* BIOCH 423 or 431 or consent of instructor.

BIOCH 433, 633 General Biochemistry Laboratory I 2(0,4) Experiments selected to illustrate current methods used in biochemical research. *Preq:* Concurrent enrollment in BIOCH 423 or 431.

BIOCH 434, 634 General Biochemistry Laboratory II 2(0,4) Continuation of BIOCH 433. *Preq:* Concurrent enrollment in BIOCH 432.

BIOCH 436, 636 Nucleic Acid and Protein Biosynthesis 2(2,0) Examines how nucleic acids and proteins are synthesized in prokaryotic and eukaryotic cells. Designed for students interested in biochemistry, cell biology, molecular biology, and cell physiology. *Preq:* BIOCH 423, 431 or 432 or consent of instructor.

BIOCH 443, 643 Biochemical Basis of Disease 3(3,0) Topics in heritable human metabolic disorders including clinical features and newborn screening, genetic testing, the biochemical basis, and treatment. *Preq:* GEN 302, BIOCH 301, or consent of instructor.

BIOCH 491, H491 Special Problems in Biochemistry 1-8(0,3-24) Orientation in biochemical research (i.e., experimental planning, execution, and reporting). May be repeated for a maximum of eight credits.

BIOCH (GEN) 493, H493 Senior Seminar 2(2,0) Analysis and discussion of papers from the primary literature in the life sciences particularly in biochemistry. Students find pertinent articles in the primary literature and present and analyze the selected reading.

BIOENGINEERING

Professors: R. L. Dooley, M. LaBerge, Interim Chair; R. A. Latour, Jr.; *Associate Professors:* K. J. L. Burg, J. J. Hickman, N. R. Vyavahare; *Assistant Professors:* T. Bateman, T. Boland, B. Z. Gao, A. Ramamurthi, C. K. Webb, X. Wen

BIO E 201 Organs and Their Replacements 3(3,0) Provides engineering, biological, and physical science students with an overview of the replacement of human body parts and the problems related to artificial devices.

BIO E 302 Biomaterials 3(3,0) Study of metallic, ceramic, and polymer materials used for surgical and dental implants; materials selection, implant design, physical and mechanical testing; corrosion and wear in the body. In addition, physical and mechanical properties of tissue as related to microstructure are studied. *Preq:* CME 210 or consent of instructor.

BIO E 320 Biomechanics 3(3,0) Study of relation between biological and mechanical functions of musculoskeletal tissues such as bone, ligaments, muscles, cartilage, etc.; mechanics of human joints; analysis of implants and implant failure. *Preq:* or *Coreq:* E M 304 or consent of instructor.

BIO E 401 Biomedical Design 3(3,0) Covers basic steps in designing medical devices intended for short- or long-term implantation. Materials selection, fabrication processes, performance standards, cost analysis, and design optimization are covered. Design project is required. For engineering majors only. *Preq:* BIO E 302, 320, E M 304.

BIO E 420 Sports Engineering 3(3,0) Study of engineering principles involved in sports: body systems in human motion, analysis of gait, basic performance patterns in athletic movements, performance improvements, design of sports equipment. *Preq:* BIO E 302 and 320 or consent of instructor.

BIO E 450, H450 Special Topics in Bioengineering 1-4(1-4,0) Comprehensive study of a topic of current interest in the field of biomedical engineering under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

BIO E (CME) 480, 680 Research Principles and Concepts 1(1,0) Introduces seniors and graduate students to principles and practices of scientific research. Topics include developing scientific concepts, developing projects, pursuing research, collaborating in multi-disciplinary teams, patenting and publishing technical and scientific information, and reviewing professional and ethical standards of performance. To be taken Pass/Fail only.

BIOLOGICAL SCIENCES

Professors: R. E. Ballard, N. D. Camper, S. A. Gauthreaux, Jr., S. J. Klaine, E. B. Pivonia, C. D. Rice, T. R. Scott, T. P. Spira, J. R. Tomasso, Jr., A. P. Wheeler, Chair; J. B. Wourms. **Associate Professors:** J. M. Colacino, R. R. Montanucci, M. B. Pracek, D. W. Tonkyn. **Assistant Professors:** R. W. Bloh, L. A. Temesvari, P. van den Hurk. **Lecturers:** K. C. Hall, T. McNitt-Scott

BIOSC 101 Frontiers in Biology I 1(1,0) Introduces Biological Sciences majors to recent advances in molecular and cellular biology. Areas covered include genetic engineering, genetics, cell biology and development. *Coreq:* BIOL 103 or 110 or consent of course coordinator.

BIOSC 102 Frontiers in Biology II 1(1,0) Introduces Biological Sciences majors to recent advances in organismal and evolutionary biology. Topics include ecology, evolution, behavior, and organismal biology. *Preq:* BIOL 103 or 110 or consent of course coordinator.

BIOSC 200 Biology in the News 3(3,0) For non-science majors. Students examine current topics of biology appearing in newspapers and other current media. Uses a problem-based learning approach, with students working as teams and individually on areas of interest identified by the class. *Preq:* ENGL 102, General Education Science Requirements.

BIOSC 205 Plant Form and Function 3(3,0) Introductory course for students majoring in plant sciences. Integrates lecture and laboratory and emphasizes fundamental structures and functions of higher plants. *Preq:* BIOL 103 or consent of instructor.

BIOSC 206 Plant Form and Function Laboratory 1(0,3) Laboratory for BIOSC 205. *Preq* or *Coreq:* BIOSC 205 or consent of instructor.

BIOSC 222 Human Anatomy and Physiology I 4(3,3) Basic introductory course in integrated human anatomy and physiology covering cells and tissues; integumentary, skeletal, muscular and nervous systems; sensory organs. Physiology is stressed. Structured primarily for Nursing and other health-related curricula. *Preq:* BIOL 103 or 110; CH 101 and 102, or 105 and 106.

BIOSC 223 Human Anatomy and Physiology II 4(3,3) Continuation of BIOSC 222 covering endocrine, reproductive, cardiovascular, lymphatic, respiratory, urinary, and digestive systems; fluid and electrolyte balance. Physiology is stressed. *Preq:* BIOSC 222 or consent of instructor.

BIOSC (ENT) 301 Insect Biology and Diversity 4(3,3) See ENT 301.

BIOSC 302, H302 Invertebrate Biology 3(3,0) In-depth survey and comparison of free-living invertebrate animals emphasizing functional anatomy, development, and evolutionary relationships. *Preq:* Introductory two-semester biology sequence with laboratory. *Coreq:* BIOSC 306.

BIOSC 303, H303 Vertebrate Biology 3(3,0) Comprehensive survey of vertebrate animals including their taxonomy, morphology, evolution, and selected aspects of the natural history and behavior. *Preq:* Introductory two-semester biology sequence with laboratory.

BIOSC 304, H304 Biology of Plants 3(3,0) Survey of the major groups of plants, their biology, diversity, and evolution. *Preq:* BIOL 104 or 111 or BIOSC 205.

BIOSC 305, H305 Biology of Algae and Fungi 3(3,0) Introduction to the biology of the major groups of algae and fungi. Emphasizes how select representatives of the algae and fungi are adapted to their environment through structural, physiological, and life-cycle modifications. *Preq:* BIOL 104 or 111 or BIOSC 205.

BIOSC 306 Invertebrate Biology Laboratory 1(0,3) Survey and comparison of the biology of living invertebrates, examples of which are drawn primarily from the southeastern coast of the United States. *Preq:* Introductory two-semester biology sequence with laboratory. *Coreq:* BIOSC 302.

BIOSC 307 Vertebrate Biology Laboratory 1(0,3) Comparative and phylogenetic study of the gross morphology of vertebrates. *Preq* or *Coreq:* BIOSC 303.

BIOSC 308 Biology of Plants Practicum 1(0,3) Laboratory exercises that explore the major groups of plants, their biology, diversity, and evolution. *Preq* or *Coreq:* BIOSC 304.

BIOSC 309 Algae/Fungi Practicum 1(0,3) Practice in the manipulation and examination of selected algae and fungi, with emphasis on culture techniques and examination of the structure and adaptations of the algae and fungi to different environments. *Preq* or *Coreq:* BIOSC 305.

BIOSC (W F B) 313 Conservation Biology 3(3,0) See W F B 313.

BIOSC 320 Field Botany 4(2,4) Introductory study of the taxonomy, ecology, and evolution of plants in their natural environment with an emphasis on identification and characteristics of representative species and plant communities in the Carolinas. Includes one or two required Saturday field trips. *Preq:* BIOL 104, 111, or BIOSC 205, or consent of instructor.

BIOSC 335 Evolutionary Biology 3(3,0) Introduction to basic concepts and underlying principles of modern evolutionary biology. Topics include a historical overview of evolutionary theories, elementary population genetics, principles of adaptation, speciation, systematics and phylogenetic inference, fossil record, biogeography, molecular evolution, and human evolution. *Preq:* GEN 302 or equivalent.

BIOSC (PL PH) 340 Plant Medicine and Magic 3(3,0) See PL PH 340.

BIOSC (ENT) 400, H400, 600 Insect Morphology 4(3,3) Even-numbered years. See ENT 400.

BIOSC 401, H401, 601 Plant Physiology 3(3,0) Relations and processes pertaining to maintenance, growth, and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products and liberation of energy. *Preq:* BIOL 104 or 111 or BIOSC 205 and CH 102. *Coreq:* BIOSC 402.

BIOSC 402, 602 Plant Physiology Laboratory 1(0,3) Laboratory exercises and experiments designed to indicate the relations and processes which pertain to maintenance, growth, and reproduction of plants, including absorption of matter and energy, water relations of the plant, utilization of reserve products, and liberation of energy. *Coreq:* BIOSC 401.

BIOSC 403, H403, 603 Protozoology 3(3,0) Survey of the protozoa with emphasis on organization and function. Representative types of both free-living and parasitic forms are examined for each major taxon. *Preq:* BIOL 104 or 111.

BIOSC 404, H404, 604 Protozoology Laboratory 2(1,2) Laboratory exercises reinforce the material presented in BIOSC 403 and introduce students to techniques used in collection, preservation, and examination of protozoans. *Coreq:* BIOSC 403.

BIOSC (GEN) 405, H405, 605 Molecular Genetics of Eukaryotes 3(3,0) See GEN 405.

BIOSC 406, H406, 606 Introductory Plant Taxonomy 3(3,0) Introduction to the basic principles and concepts of plant systematics with emphasis on the plants of South Carolina. *Preq:* BIOL 104 or 111 or BIOSC 205. *Coreq:* BIOSC 407.

BIOSC 407, 607 Plant Taxonomy Laboratory 1(0,3) Introduction to basic techniques of plant taxonomy with laboratory and field emphasis on the flora of South Carolina. *Coreq:* BIOSC 406.

BIOSC 408, H408, 608 Comparative Vertebrate Morphology 3(3,0) Phylogeny and diversity of vertebrates and study of their comparative morphology, leading to an understanding of the relationships and functioning of living organisms. *Preq:* BIOL 104 or 111. *Coreq:* BIOSC 409.

BIOSC 409, H409, 609 Comparative Vertebrate Morphology Laboratory 2(0,5) Comparative anatomy of representative vertebrates; methods used in preparing specimens for study and display. *Coreq:* BIOSC 408.

BIOSC 410, 610 Limnology 3(3,0) Detailed introduction to the physical, chemical, and biological interrelationships that characterize inland water environments. A fundamental approach to the interactions of components of the environment is developed at a theoretical level. *Preq:* Junior standing in a life science or consent of instructor.

BIOSC 411, H411, 611 Limnological Analyses 2(1,2) Examines a broad range of topics covered with both standing and running fresh waters. About one-third of the laboratory exercises address the major physical components of lakes and streams. The remainder provide rationale and methods for quantitative analyses of biota, as well as some integrated analyses of whole ecosystems. *Preq* or *Coreq:* BIOSC 410 or 443.

BIOSC (EN R) 413 Restoration Ecology 3(3,0) See EN R 413.

BIOSC (AVS, MICRO) 414, H414, 614 Basic Immunology 4(3,3) See MICRO 414.

BIOSC (ENT) 415, 615 Insect Taxonomy 3(1,6) Odd-numbered years. See ENT 415.

BIOSC (GEN) 416, 616 Recombinant DNA 3(3,0) See GEN 416.

BIOSC 417, 617 Marine Biology 3(3,0) Survey of the organisms that live in the sea and their adaptations to the marine environment. Characteristics of marine habitats, organisms, and the ecosystems are emphasized. *Preq:* BIOL 104, 111, or consent of instructor.

BIOSC (GEN, MICRO) 418, 618 Biotechnology I: Nucleic Acids Techniques 4(2,4) See GEN 418.

BIOSC 420, H420, 620 Neurobiology 3(3,0) Broad background in neurobiology. Topics include neuroanatomical structure-function; conduction in the neuron; neurite growth and development; neuromuscular junction; chemistry, physiology, and pharmacology of specific neurotransmitters and receptors; visual process; axoplasmic transport; hypothalamic-pituitary regulation; theories of behavior; theories of learning and memory. *Preq:* BIOCH 301 or 305 or consent of instructor.

BIOSC 425, 625 Introductory Mycology 3(3,0) Introduction to the biology of all the groups of fungi and some related organisms, with considerations of the taxonomy, morphology, development, physiology, and ecology of representative forms. *Preq:* BIOL 104 or 111 or BIOSC 205.

BIOSC 426, 626 Mycology Practicum 2(1,2) Application of the principles of mycological techniques, including isolation, culture, identification, and microscopic study of fungi. Examples from all major groups of fungi are included. *Preq* or *Coreq:* BIOSC 425.

BIOSC (ENT, ENTOX) 430, 630 Toxicology 3(3,0) See ENTOX 430.

BIOSC 432, H432, 632 Animal Histology 3(3,0) Structural and functional study of the basic tissues of animals and tissue makeup of organs. Emphasis is on light microscopy level with selected tissue studied at the electron microscope level. *Preq:* BIOSC 303 or consent of instructor. *Coreq:* BIOSC 433.

BIOSC 433, H433, 633 Animal Histology Laboratory 2(1,2) Microscopic examination of basic animal tissue types and the tissue makeup of organs which comprise systems. *Coreq:* BIOSC 432.

BIOSC (ENT) 436, 636 Insect Behavior 3(2,3)F Odd-numbered years. See ENT 436.

BIOSC 440, H440, 640 Developmental Animal Biology 3(3,0) Events and mechanisms responsible for the development of multicellular animals. Gametogenesis, fertilization, embryonic development, cellular differentiation, morphogenesis, larval forms and metamorphosis, asexual reproduction, regeneration, malignancy, and aging are analyzed in terms of fundamental concepts and control processes. *Preq:* BIOCH 301 or 305 or consent of instructor. *Coreq:* BIOSC 450.

BIOSC 441, H441, 641 Ecology 3(3,0) Study of basic ecological principles underlying the relationships between organisms and their biotic and abiotic environments. Includes physiological, population, and community ecology, with applications of each to human ecological concerns. *Preq:* BIOL 104, 111 or BIOSC 205 or consent of instructor.

BIOSC 442, H442, 642 Biogeography 3(3,0) Study of patterns of distribution of plants and animals in space and time. *Preq:* BIOSC 302 or 303 and 304 or 305 or consent of instructor.

BIOSC 443, 643 Aquatic Ecology 3(3,0) Study of basic ecological principles and concepts as they apply to aquatic environments: rivers and streams, lakes and ponds, reservoirs, swamps, marshes, estuaries, and marine systems. *Preq:* Junior standing in a life science or consent of instructor.

BIOSC 445, H445, 645 Ecology Laboratory 2(1,2) Modern and classical approaches to the study of ecological problems discussed in BIOSC 441. Students are introduced to field, laboratory and computer-based analyses of plant and animal populations and communities. *Preq* or *Coreq:* BIOSC 441.

BIOSC 446, H446, 646 Plant Ecology 3(3,0) Ecology of plants in relation to their biotic and abiotic environments. Individual organisms, populations, and communities are considered with an emphasis on seed plants in terrestrial environments. *Preq:* BIOL 104, 111 or BIOSC 205 or consent of instructor.

BIOSC 447, H447, 647 Plant Ecology Laboratory 2(1,2) Experimental and observational approach to addressing principles discussed in BIOSC 446. Students are introduced to field and laboratory methods involving individual organisms, populations, and communities. *Preq* or *Coreq:* BIOSC 446 or consent of instructor.

BIOSC 450, H450, 650 Developmental Biology Laboratory 2(1,2) Examines a broad range of topics concerned with the development of multi-cellular animals such as gametogenesis, fertilization, embryonic development, cell differentiation, morphogenesis, larval metamorphosis, and regeneration. Laboratory exercises provide the rationale and methods for the descriptive and experimental analysis of development in representative invertebrates and vertebrates. *Preq* or *Coreq:* BIOSC 440 or equivalent.

BIOSC 452, 652 Plant Anatomy and Morphology 3(3,0) Study of the anatomy, reproduction, and phylogenetic relationships of vascular plants. *Preq:* BIOL 104, 111 or BIOSC 205, or consent of instructor.

BIOSC 453, 653 Plant Anatomy and Morphology Laboratory 2(1,2) Laboratory focusing on the anatomy, reproduction, and phylogenetic relationships of vascular plants. *Coreq:* BIOSC 452.

BIOSC (ENT) 455, H455, 655 Medical and Veterinary Entomology 3(2,3)F Odd-numbered years. See ENT 455.

BIOSC 456, H456, 656 Medical and Veterinary Parasitology 3(3,0) Introduction to parasitism in the animal kingdom; emphasizes basic and applied principles related to economically and medically important diseases. Classical and experimental approaches to the study of parasitism are examined in reference to protozoa, helminths, and arthropods. *Preq:* BIOL 104 or 111. *Coreq:* BIOSC 457.

BIOSC 457, H457, 657 Medical and Veterinary Parasitology Laboratory 2(1,2) Laboratory to reinforce material presented in BIOSC 456. Introduces students to both live and preserved human/animal parasites. Also introduces techniques used in collection, preservation, and examination of animal parasites. *Coreq:* BIOSC 456.

BIOSC 458, H458, 658 Cell Physiology 3(3,0) Study of the chemical and physical principles of cell function emphasizing bioenergetics and membrane phenomena. *Preq:* BIOCH 301 or 305 or consent of instructor.

BIOSC 459, H459, 659 Systems Physiology 3(3,0) Physiological systems of vertebrates and their homeostatic controls. Function of the major physiological systems is described in terms of anatomical structure and chemical and physical principles. *Preq:* One year each of biology, chemistry, and physics or consent of instructor.

BIOSC 460, 660 Systems Physiology Laboratory 2(1,2) Modern and classical experimental methods are used to demonstrate fundamental physiological principles discussed in BIOSC 459. Students are introduced to computer-aided data acquisition and computer simulations of physiological function. *Preq* or *Coreq:* BIOSC 459.

BIOSC 461, H461, 661 Cell Biology 3(3,0) In-depth analysis of how and where intracellular and extracellular molecules control general and specific cellular functions such as gene expression, secretion, motility, signaling, cell-cycle control and differentiation. Taught and graded at a level where students are expected to infer from and integrate cellular events. *Preq:* BIOCH 301 or consent of instructor.

BIOSC 462, 662 Cell Biology Laboratory 2(1,2) Accompanies BIOSC 461; focuses on molecular and microscopic analysis of eukaryotic cells. *Coreq:* BIOSC 461.

BIOSC 464, 664 Mammalogy 3(2,3) Origin, evolution, distribution, structure, and function of mammals, with laboratory emphasis on the mammals of South Carolina. Field collection required. *Preq:* BIOSC 303 or consent of instructor.

BIOSC (GEN, HORT) 465, 665 Plant Molecular Biology 3(3,0) See HORT 465.

BIOSC 468, 668 Herpetology 3(2,3) Systematics, life history, distribution, ecology, and current literature of amphibians and reptiles. Laboratory study of morphology and identification of world families and U.S. genera, as well as all southeastern species. Field trips are required. *Preq:* BIOSC 303 or consent of instructor.

BIOSC (ENT, W F B) 469, H469, 669 Aquatic Insects 3(1,6)S Odd-numbered years. See ENT 469.

BIOSC 470, H470, 670 Animal Behavior 3(3,0) Historical and modern developments in animal behavior emphasizing the evolutionary and ecological determinants of behavior. A synthesis of ethology and comparative psychology. *Preq:* BIOSC 302 or 303 or consent of instructor.

BIOSC 471, 671 Animal Behavior Laboratory 1(0,3) Laboratory exercises that explore the behavior of animals. Emphasis is on behavioral observation and analysis and presentation of findings in a report format. *Preq* or *Coreq:* BIOSC 470 or consent of instructor.

BIOSC 472, 672 Ornithology 4(3,3) Biology of birds: their origin and diversification, adaptations, phylogeny, classification, structure and function, behavior, ecology, and biogeography. Field identification is emphasized, and field trips are required. *Preq:* BIOSC 303 or consent of instructor.

BIOSC 475, 11475, 675 Comparative Physiology 3(3,0) Physiological systems of invertebrates and vertebrates with emphasis on environmental adaptation. Physiological principles as they relate to metabolism, thermoregulation, osmoregulation, respiration, and neural and integrative physiology. *Prq:* One year each of biology, chemistry, and physics or consent of instructor.

BIOSC 476, H476, 676 Comparative Physiology Laboratory 2(1,2) Modern classical experimental methods are used to demonstrate fundamental physiological principles discussed in BIOC 475. Students are introduced to computer-aided data acquisition and manipulation as well as computer simulations of physiological function. *Prq:* or *Coreq:* BIOC 475.

BIOSC 477, 677 Ichthyology 3(2,3) Systematics, life history, distribution, ecology, and current literature of fish. Laboratory study of morphology and identification of U.S. genera, as well as all southeastern species. Field trips are required. *Prq:* BIOC 303 or consent of instructor.

BIOSC (AVS) 480, 680 Vertebrate Endocrinology 3(3,0) Introduction to the basic principles of neuro-endocrine integration and homeostatic maintenance in vertebrates. Comparative morphology and physiology of various endocrine tissues and hormone chemistry and modes of action are considered. *Prq:* BIOC 303, organic chemistry, or consent of instructor.

BIOSC 486 Natural History 3(3,0) Interdisciplinary examination, through readings and critical discussion, of concepts of nature and biodiversity in relation to human endeavors. Course seeks to achieve a balanced perspective from which to seek compromises between conflicting views of nature. *Prq:* BIOC 441, 443, or 446, or equivalent, or consent of instructor.

BIOSC 490 Selected Topics in Biological Sciences 1-4(1-4,0-9) Comprehensive study of selected topics not covered in other course offerings. May be repeated for a maximum of eight credits, but only if different topics are covered. *Prq:* Junior standing or consent of instructor.

BIOSC 491, H491 Special Problems in Biological Sciences 2-4(0,6-12) Research problems in selected areas of biological sciences to provide an introduction to research planning and techniques. May be taken for a maximum of eight credits. *Prq:* Junior or Senior standing or consent of instructor.

BIOSC 493 Senior Seminar 2(2,0) Analysis and discussion of papers from the primary literature of the biological sciences. Students search the primary literature, present and analyze selected readings. *Prq:* Senior standing and either ENGL 314 or COMM 250 or consent of instructor.

BIOLOGY

Professors: J. L. Dickey, D. R. Helms, R. J. Kostinski, W. M. Surver, *Coordinator*; *Associate Professors:* R. A. Garcia, C. K. Revis-Wagner, A. D. Smith, J. A. Waldvogel; *Assistant Professors:* K. D. Layfield, M. V. Ruppert, S. A. Sparace; *Lecturers:* J. R. Cummings, V. C. Minor

BIOL 101 Concepts in Biology 1-4(3,3) First in a two-semester general education sequence covering fundamental biological concepts. Emphasizes the process of scientific inquiry applied to evolution, cell structure and function, genetics, and metabolism. Develops biological literacy by applying concepts to important issues in everyday life. Not open to students who have received credit for BIOL 110/111 or BIOL 103/104.

BIOL 102 Concepts in Biology II 4(3,3) Continuation of BIOL 101, emphasizing the process of scientific inquiry applied to biodiversity, animal and plant structure and function, ecology, and human impact on the environment. Develops practical biological literacy by applying concepts to important issues in everyday life. Not open to students who have received credit for BIOL 110/111 or BIOL 103/104. *Prq:* BIOL 101.

BIOL 103, H103 General Biology I 4(3,3) First in a two-semester sequence on the fundamentals of biology. Lecture and laboratory emphasize the structural, molecular, and energetic basis of cellular activities, fundamentals of genetic variability, reproductive strategies of organisms, and scientific processes. Diversity of animals and principles of evolution are introduced. Credit toward a degree will be given for only one of the following combinations: BIOL 110/111 or 103/104, dependent on the requirements for the major.

BIOL 104, H104 General Biology II 4(3,3) Continuation of BIOL 103, emphasizing animals and plants as functional units, evolution and diversity of plants, and principles of evolution and ecology. Credit toward a degree will be given for only one of the following combinations: BIOL 110/111 or 103/104, dependent on the requirements for the major. *Prq:* BIOL 103.

BIOL 109 Introduction to Life Science 4(3,3) Survey of topics in botany, zoology, microbiology, and ecology emphasizing comprehension and practical application of life-science concepts to experiments and activities for the elementary school classroom. Enrollment priority will be given to Early Childhood and Elementary Education majors.

BIOL 110, H110 Principles of Biology I 5(4,3) Introductory course designed for students majoring in biological disciplines. Integrates lecture and laboratory and emphasizes a modern, quantitative, and experimental approach to explanations of structure, composition, dynamics, interactions, and evolution of cells and organisms. High school chemistry is recommended. Credit toward a degree will be given for only one of the following combinations: BIOL 110/111 or 103/104, dependent on the requirements for the major. *Coreq:* CH 101.

BIOL 111, H111 Principles of Biology II 5(4,3) Continuation of BIOL 110; emphasizes the study of plants and animals as functional organisms and the principles of ecology. Credit toward a degree will be given for only one of the following combinations: BIOL 110/111 or 103/104, dependent on the requirements for the major. *Prq:* BIOL 110.

BIOL 201 Biotechnology and Society 3(3,0) Introduction to the theories, fields, and applications of biotechnology including the structure and function of genes and their manipulation to improve plant and animal productivity and human health. Individual case studies are examined including social and ethical issues surrounding biotechnology-based research and development. Not open to Genetics majors. *Prq:* BIOL 102 or equivalent, or consent of the instructor.

BIOSYSTEMS ENGINEERING

Professors: W. H. Allen, *Chair*; D. E. Brune, R. B. Dodd, Y. J. Han, D. E. Linvill, *Associate Professors*; C. M. Drapcho, T. H. Walker, *Assistant Professor*; T. O. Owino

B E 214 Fabrication and Manufacturing Methods 2(1,3) Introduction to machine and structure fabrication for biosystems. Topics include metallurgy, arc and gas welding, fasteners, plastics, and protective coatings. *Prq:* E M 201. *Coreq:* E G 209.

B E 221 Surveying for Soil and Water Resources 2(1,3) Fundamentals of land measurement and traverse computations. Surveying practice in traverse and topographic surveys preliminary to design of techniques and construction of structures for resource management. *Prq:* MTHSC 106.

B E 322 Small Watershed Hydrology and Sedimentology 3(3,0) [W.1] Fundamental relationships governing rainfall disposition are used as bases for defining the hydrology of watersheds. Application of modeling techniques appropriate for runoff and sediment control is emphasized. *Prq:* PHYS 122. *Coreq:* CSENV 202.

B E 333 Environmental Modification 2(2,0) Principles of environmental modification and control including energy exchange, psychrometrics, heat and moisture balance, biological interactions, control systems, and basic elements of heating, ventilation, and air conditioning. *Prq:* PHYS 221; M E 310 or consent of instructor.

B E 350, H350 Microcomputer Controls in Biosystems 2(1,3) Microcomputer interfacing and digital control are studied for application to agriculture, aquaculture, biotechnology, and other biosystems. Topics include digital electronic circuits and components, microcomputer architecture and interfacing. *Prq:* E C E 307, MTHSC 208.

B E 357 Machine Unit Operations 2(2,0) Unit operations of machines useful to biosystems engineers are studied from a functional and applications approach. Machine cost analysis is included. *Prq:* B E 214, E M 201, or consent of instructor.

B E 362, H362 Energy Conversion for Biosystems 3(2,3) Topics include energy requirements of biosystems, direct energy conversion methods, characteristics of energy sources, and economics. Energy conversion methods used in biosystems and their limitations are presented. *Prq:* M E 310.

BE 364 Non-Point Source Pollution Management and Control 3(2,3) Fundamentals of environmental engineering; includes quantification of environmental impact and ecosystem management related to non-point source environmental contaminants and nutrients and planning and design of waste management systems. *Preq:* One year of chemistry, junior standing or consent of instructor.

BE 370 Practicum 1-3 Preplanned internship with an approved employer involved with biosystems engineering endeavors. A minimum 130 hours of supervised responsibility is required per credit hour. Evaluation is based on activity journal, written/oral report, and an evaluation from the supervisor. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Preq:* Junior standing and departmental consent.

BE (CSENV) 408, 608 Land Treatment of Wastewater and Sludges 3(3,0) See CSENV 408.

BE 416, H416, 616 Biosystems Engineering Capstone Design 3(2,3) Fundamentals of mechanical design with applications to biosystems, biomaterials, and bioprocesses. Approved design project is required. *Preq:* All required 300-level engineering courses except 1E 384 and BE 364.

BE 421 Engineering Systems for Soil Water Management 2(1,3) Fundamentals of design related to drainage of lands, irrigation, and modification of the microenvironment for optimum productivity are presented. *Preq:* MTHSC 208. *Coreq:* CE 341.

BE (CH E) 428, 628 Biochemical Engineering 3(3,0) Use of microorganisms and enzymes for the production of chemical feedstocks, single-cell protein, antibiotics, and other fermentation products. Topics include kinetics and energetics of microbial metabolism, design and analysis of reactors for microbial growth and enzyme-catalyzed reactions, and considerations of scale-up, mass transfer, and sterilization during reactor design. *Preq:* BE 430, BIOCH 301, MICRO 305 (for Biosystems Engineering majors); *Coreq:* CHE 312, 450 (for Chemical Engineering majors).

BE 430, 630 Problem Solving Methods and Models in Biosystems Engineering 3(3,0) Fundamentals of mathematical and computer modeling of physical, chemical, and biological phenomena applied to biosystems engineering. Topics include the modeling process, problem solving methods, numerical techniques, estimating model coefficients, validation, and classic models used in biosystems, biomedical, environmental and agricultural engineering. *Preq:* BIOCH 301 or 305 or consent of instructor. *Coreq:* M E 310 or instruction in thermodynamics.

BE 431, 631 Structural Design for Biosystems 2(2,0) Analysis and design of structures and statically determinant components with emphasis on wood. *Preq:* C E 200 or E M 304.

BE 435, 635 Applications in Biotechnology Engineering 3(2,3) Biocengineering principles applied to the expanding fields of agricultural biotechnology, ecotechnology, and biomedical technology. Specific applications include waste treatment and ecological engineering, bioreactor propagation of plant and animal cells and tissues, applied genomics and synthetic seed production, biosensors and biomonitoring, biological implants and materials biocompatibility. *Preq:* BE (CH E) 428.

BE 442, 642 Properties and Processing of Biological Products 2(1,3) Study of engineering properties of biological materials and their uniqueness as design restraints on systems for handling, processing and preserving biological products. *Preq:* BE 333, C E 341, E M 304, M E 310.

BE 450, H450, 650 Instrumentation for Biosystems Engineers 3(2,3) [C-1] Overview of modern instrumentation techniques for biosystems. Laboratory use of equipment is emphasized. Topics include performance characteristics of instruments, analog-signal conditioning, transducer theory and applications, and digital systems for data acquisition and control. *Preq:* BE 350, familiarity with computer programming, or consent of instructor.

BE (EE&S, FOR) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) Topics dealing with development and protection of land, air, water, and related resources are covered by seminar with instructor and invited lecturers. Current environmental and/or resource conservation issues are addressed. *Preq:* Senior standing, consent of instructor.

BE 471 Engineering Research and Management 2(1,3) [W-1] Research project is conducted on a biosystems engineering problem. Engineering economics, engineering creativity, and project management are incorporated in addition to communication skills. *Preq:* Senior standing in an engineering curriculum.

BE 473 Special Topics in Biosystems Engineering 1-3(1-3,0) Comprehensive study of special topics not covered in other courses. Emphasis is on independent pursuit of detailed investigations. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing and consent of department.

BE (EE&S, IE) 484, 684 Municipal Solid Waste Management 3(3,0) See EE&S 484.

BUSINESS

BUS 101 Business Foundations 1(1,0) Overview of the business environment. Topics include the economic and legal foundations of business and an introduction to the human resources, marketing, operations, and financial functions of global businesses. To be taken Pass/Fail only.

CALHOUN HONORS SEMINAR

The following courses may be taken to satisfy Accreditation Board for Engineering and Technology (ABET) requirements for depth in humanities and social sciences by pairing or sequencing with humanities or social science subject areas as designated in the syllabus for each Calhoun Honors Seminar course offering.

C H S H201 Structures and Society 3(3,0) Interdisciplinary honors seminar that examines selected structures regarded as monuments to artistic creativity and technological genius and the ways that structures affect and are affected by the societies that produce them. *Preq:* Membership in Calhoun Honors College Program.

C H S H202 Science, Culture, and Human Values 3(3,0) Interdisciplinary honors seminar that unifies natural scientific, social scientific, and humanistic disciplines into a holistic view of the modern world and its future. May be repeated for

a maximum of six credits, but only if different topics are covered. *Preq:* Membership in Calhoun Honors College Program.

C H S H203 Society, Art, and Humanities 3(3,0) Combines readings and methodologies from the social sciences, arts, and humanities to study the interrelationships among the disciplines and their societal effects. Subjects vary. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Membership in Calhoun Honors College Program.

C H S H204 Honors Study/Travel 1(0,3) Study/travel experience related to a three credit Calhoun Honors Seminar. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Membership in Calhoun Honors College Program.

C H S H205 Methods of Interpretation 1(1,0) Seminar to teach students how to interpret documents, works of art, structures, and scholarly materials related to a three credit Calhoun Honors Seminar. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Membership in Calhoun Honors College Program.

C H S H400 Honors Contract 0(0,0) Advanced study and research undertaken in conjunction with any 300-400-level course. Contract requires prior approval by instructor and Honors Director. To be taken Pass/Fail only. May be repeated once, but only if in conjunction with different course. *Preq:* Membership in Calhoun Honors College.

CERAMIC AND MATERIALS ENGINEERING

Professors: J. R. Aspland, S. B. Bhaduri, D. A. Brosnan, M. J. Drews, M. S. Ellison, *Director;* B. C. Goswami, C. W. Jarvis, B. L. Lee, H. J. Rack, C. D. Rogers, E. A. Vaughn; *Associate Professors:* J. M. Ballato, S. H. Foulger, G. C. Lickfield, E. C. Skaar, T. D. Taylor; *Assistant Professors:* P. Brown, J. Luo, I. A. Luzinov

C M E 210 Introduction to Materials Science 3(3,0) Beginning course in materials science designed primarily for engineering students. Study of the relation between the electrical, mechanical, and thermal properties of products and the structure and composition of these products. All levels of structure are considered from gross structures easily visible to the eye through electronic structure of atoms. *Preq:* CH 102, MTHSC 108.

C M E 221 Materials Processing I 3(3,0) Introduction into the principles underlying the processing/manufacturing of ceramic, polymeric, and metallic materials. *Coreq:* C M E 225.

C M E 222 Materials Processing II 3(3,0) Continuation of C M E 221 discussing the principles underlying the processing/manufacturing of ceramic, polymeric, and metallic materials. *Preq:* C M E 221; *Coreq:* C M E 242.

C M E 225 Structure of Materials 3(3,0) Introductory course in fundamentals of atomic bonding as it relates to crystal structure and the resulting properties of metals, ceramics, and polymers. Emphasis is placed on the influence of crystallography and microstructure on the physical and chemical performance of materials. *Preq:* CH 102, PHYS 122, MTHSC 108.

- C M E 226 Thermodynamics of Materials 3(3,0)** Introduction to physical laws that govern the equilibrium products of chemical and thermal reactions. Covers the three laws of thermodynamics, phase equilibria, energy requirements for reactions, material corrosion, and environmental stability. *Preq:* CH 102, MTHSC 108; *Coreq:* PHYS 221.
- C M E 227 Transport Phenomena 3(3,0)** Kinetic aspects of mass, heat, and fluid transport as they relate to the processing and performance of materials. *Preq:* C M E 226; *Coreq:* MTHSC 208.
- C M E 228 Phase Diagrams for Materials Processing and Applications 3(3,0)** Teaches students to use single component, binary, and ternary phase diagrams to analyze material processing routes and utilization. Reaction pathways by which material microstructure evolves and the relationship of reaction pathway to equilibrium phase diagrams are considered, as are material interactions/degradation during use. *Preq:* C M E 226.
- C M E 241 Metrics Laboratory 1(0,3)** Provides basic knowledge of statistical techniques and testing procedures used to evaluate materials. Sampling procedures, calculation of averages, confidence intervals, Weibull statistics, precision and accuracy to enable quality decision making are included. *Coreq:* C M E 221.
- C M E 242 Fabrication and Microscopy Laboratory 2(0,6) [O.1]** Laboratory demonstrating how useful engineering products and components may be fabricated. Statistical experimental design and ANOVA are introduced to evaluate the effects of processing inputs on material properties. Sampling and sample preparation methods and optical microscopy analysis are presented. *Preq:* C M E 225, 241; *Coreq:* C M E 222.
- C M E H300 Honors Seminar 1(1,0)** Acquaints students enrolled in the Departmental Honors Program with current research issues in the profession. This assists students in preparing a research proposal for the Senior Thesis. To be taken Pass/Fail only. *Preq:* Junior standing, admission to departmental honors program.
- C M E 303 Noncrystalline Materials 3(3,0)** Basic course on the fundamentals of the noncrystalline state. Topics include cooling kinetics and effects on formation, as well as physical properties of noncrystalline substances, in metallic, polymeric, and ceramic systems. *Preq:* C M E 228, 320.
- C M E 320 Mechanical Behavior of Materials 3(3,0)** Covers the microstructural basis of deformation and fracture in ceramic, metallic, and polymeric systems. *Preq:* C M E 225, MTHSC 208.
- C M E 321 Characterization of Materials 3(3,0)** Provides students with an overview of the commonly used materials characterization techniques, including x-ray diffraction, thermal analysis, microscopy, and surface analysis. *Preq:* C M E 225; *Coreq:* C M E 341.
- C M E 322 Thermal Processing of Materials 3(3,0)** Description and analysis of thermal processing steps. Treatment using the fundamental science of processes and the engineering of commercial scale equipment. Particular emphasis is placed on sintering, nucleation and growth, stress relief. Thermal analysis and phase transformation processes are also discussed. *Preq:* C M E 227, 228; *Coreq:* C M E 341.
- C M E 323 Combustion Systems and Environmental Emissions 3(3,0)** Study of the application of burners, burner controls, firing atmospheres, hydrocarbon fuels, and other energy resources to industrial kilns, furnaces, and firing operations. Topics include energy resources, fuel chemistry, combustion analysis, ratio control systems, flow and pressure measurement and control, kiln atmosphere controls, industrial burners, and flames. *Preq:* C M E 226, 322.
- C M E 330 Powder Processing 3(3,0)** Study of the cause-and-effect relationship in particulate suspensions controlling rheological behavior, porosity, packing densities, shrinkages, and other properties in powder systems. Topics include particle size analysis techniques and measurements, particle packing, rheological properties and measurements, surface area analysis, and interfacial chemicals including both flocculants and deflocculants. *Preq:* C M E 227; *Coreq:* C M E 342.
- C M E 341 Analytical Methods and Phase Development 2(0,6) [O.1]** Students learn how to use analytical tools such as XRD, thermal analysis, SEM and EDAX to characterize materials, evaluate processing effects, and determine failure modes. Provides understanding of how thermodynamics and kinetics affect the development of phases in materials. *Preq:* C M E 242; *Coreq:* C M E 321.
- C M E 342 Structure/Property Laboratory 2(0,6) [W.1]** Provides a basic understanding of how microstructure interrelationships and processes affect the physical properties of materials and how environmental effects modify structure and mechanical behavior of materials. *Preq:* C M E 341, 320.
- C M E 361 Processing of Metals and Their Composites 3(3,0)** Examines the control of microstructure-property relationships in metallic materials and their composites through development and selection of innovative manufacturing methods. *Preq:* C M E 222, 227, 320.
- C M E H395 Honors Research I 3(0,9)** Individual research under the direction of a Ceramic and Materials Engineering faculty member. *Preq:* C M E 222, 227, 228.
- C M E 402, 602 Solid State Materials 3(3,0)** Discussion of the properties of solids as related to structure and bonding with emphasis on electronic materials. Band structure theory, electronic, and optical properties are treated. *Preq:* C M E 225, PHYS 221, MTHSC 208.
- C M E 407 Senior Capstone Design 3(1,6) [C.1, O.1, W.1]** Work with industrial partners who have materials related processes or product problems. Emphasizes interdisciplinary team approach and global perspective of products and problems. Critical thinking, group effectiveness and problem solving with materials and processes. Collaborative efforts between industry and student academic teams are employed. *Preq:* C M E 441, I E 384.
- C M E 416, 616 Electrical Properties of Materials 3(3,0)** Covers a range of topics dealing with electrical and magnetic materials. Topics include metal and polymer conductors, insulators, ceramic and polymer materials for dielectric applications, and ferroelectric, piezoelectric, pyroelectric, and electrooptic materials. Metal and ceramic magnetic materials are also discussed.
- C M E 418, 618 Process Control 3(3,0)** Process control techniques and apparatus with particular emphasis on temperature measurement and control systems. Application of laboratory techniques to the control of product quality and process efficiency is included. *Preq:* C M E 303, 330, 361.
- C M E 424, 624 Optical Materials and Their Applications 3(3,0)** Introduces the interaction of materials with light. Specific topics include fundamental optical properties, materials synthesis, optical fiber and planar waveguides, and the componentry and systems-level aspects of optical communication systems. *Preq:* C M E 303, 402.
- C M E 425, 625 Micromechanical Behavior of Materials 3(3,0)** Considers advanced concepts of microstructure-deformation-fracture interrelationships in engineering materials. *Preq:* C M E 320, 342.
- C M E 431, 631 Advanced Ceramic Processing 3(3,0)** Provides advanced study of ceramic forming processes. Focus is on the many types of ceramic forming processes, such as slip casting, extrusion, dry pressing, filter pressing, and plastic forming. *Preq:* C M E 330.
- C M E 432 Manufacturing Processes and Systems 3(3,0)** Plant layout and design for manufacturing of ceramic products. Emphasizes process control and verification of processing results. Adaptation of computers in process simulation/robotics. Use of programmable logic controllers and robotics in processing. *Preq:* C M E 418, 431.
- C M E 441 Manufacturing Laboratory 1(0,3) [W.1]** Provides students with the understanding of process optimization. Use of complex experimental design schemes to elucidate the interrelationships between processing, microstructural development, and resulting properties is emphasized. *Preq:* C M E 342; *Coreq:* C M E 418.
- C M E 460, 660 Metals and Their Composites 3(3,0)** Examines the control of microstructure-property relationships in metallic materials and their composites through development and selection of appropriate thermal processing procedures. *Preq:* C M E 322, 342.
- C M E (BIO E) 480, 680 Research Principles and Concepts 1(1,0)** See BIO E 480.
- C M E 490, H490, 690 Special Topics in Ceramic Engineering I-3(1-3,0)** Study of topics not ordinarily covered in other courses. Taught as the need arises. Typical topics could include current research in a specific area or technological advances. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.
- C M E H495 Honors Research II 3(0,9)** Individual research under the direction of a Ceramic and Materials Engineering faculty member. *Preq:* C M E H395.
- C M E H497 Honors Thesis 1(1,0)** Preparation of honors thesis based on research conducted in C M E H395 and H495. *Preq:* C M E H495.

CHEMICAL ENGINEERING

Professors: D. D. Edie, C. H. Gooding, J. G. Goodwin, Jr., *Chair*; S. S. Melshheimer, A. A. Ogale, M. C. Thies; *Associate Professors:* D. A. Bruce, S. W. Harcum, D. E. Hirt, S. M. Kilbey II, R. W. Rice; *Assistant Professors:* G. M. Harrison, S. M. Husson, A. T. Metters

CH E 211 Introduction to Chemical Engineering 4(3,2) Introduction to fundamental concepts of chemical engineering, including mass and energy balances, PVT relationships for gases and vapors, and elementary phase equilibria; problem-solving and computer skills are developed in lab. *Preq:* CH 102, ENGR 120, PHYS 122.

CH E 220 Chemical Engineering Thermodynamics I 3(3,0) Topics include first and second laws of thermodynamics, ideal gases, PVT properties of real fluids, energy balances with chemical reactions, and thermodynamic properties of real fluids. *Preq:* CHE 211, MTHSC 206.

CH E H300 Honors Seminar 1(1,0) Acquaints students enrolled in the Departmental Honors Program with current research issues in the profession. This assists the student in preparing a research proposal for the Senior Thesis. To be taken Pass/Fail only. *Preq:* Admission to departmental honors program, Junior standing.

CH E 307 Unit Operations Laboratory I 3(2,3) [O.1, W.1] Laboratory work in the unit operations of fluid flow, heat transfer, and evaporation. Stress is on the relation between theory and experimental results and the statistical interpretation of those results and on report preparation and presentation. *Preq:* CH E 220, 311, E G 209. *Coreq:* EX ST 411 or MTHSC 302.

CH E 311 Fluid Flow 3(3,0) Fundamentals of fluid flow and the application of theory to chemical engineering unit operations, such as pumps, compressors, and fluidization. *Preq:* CH E 211, MTHSC 206.

CH E 312 Heat and Mass Transfer 3(3,0) Study of the basics of heat transmission and mass transport. Special emphasis is placed on theory and its application to design. *Preq:* CHE 220, 311.

CH E 319 Engineering Materials 3(3,0) Introduction to the fundamental properties and behavior of engineering materials, with emphasis on polymers, metals, ceramics, and composite materials. *Preq:* CHE 211. *Coreq:* CH 223, CH E 220.

CH E 321 Chemical Engineering Thermodynamics II 3(3,0) Continuation of CH E 220. Topics include thermodynamics of power cycles and refrigeration/liquefaction, thermodynamic properties of homogeneous mixtures, phase equilibria, and chemical reaction equilibria. *Preq:* CH E 220, MTHSC 208.

CH E 344 Chemical Engineering Junior Seminar 1(1,0) Preparation of junior chemical engineering students for entry into the profession. Timely information on job interviewing skills, career placement and guidance, professional registration, professional behavior and ethics, graduate school, and management of personal finances. Outside speakers are used frequently. To be taken Pass/Fail only. *Preq:* CH E 312, Junior standing in Chemical Engineering.

CHE 353 Process Dynamics and Control 3(3,0) Mathematical analysis of the dynamic response of process systems. Basic automatic control theory and design of control systems for process applications. *Preq:* CH E 311, MTHSC 208.

CHE H395 Honors Research I 3(0,9) Individual research under the direction of a Chemical Engineering faculty member. *Preq:* CHE H300 or consent of department honors coordinator.

CH E 401, 601 Transport Phenomena 3(3,0) Mathematical analysis of single and multi-dimensional steady-state and transient problems in momentum, energy, and mass transfer. Both the similarities and differences in these mechanisms are stressed. *Preq:* CH E 312, MTHSC 208.

CHE 407 Unit Operations Laboratory II 3(1,6) [O.1, W.1] Continuation of CH E 307 with experiments primarily on the diffusional operations. Additional lecture material on report writing and general techniques for experimental measurements and analysis of data, including statistical design of experiments. *Preq:* CH E 307, 312.

CHE 412, 612 Polymer Engineering 3(3,0) Design-oriented course in synthetic polymers. Topics include reactor design used in polymer production, effect of step versus addition kinetics on reactor design, epoxy curing reactions, polymer solubility, influence of polymerization and processing conditions on polymer crystallinity. *Preq:* CH 224 and 332 or consent of instructor.

CH E 413 Separation Processes 3(3,0) [C.1] Study of gas-liquid and liquid-liquid separation techniques with emphasis on gas absorption, distillation, and liquid-liquid extraction. *Preq:* CH 332, CH E 312, 321.

CH E (B E) 428, 628 Biochemical Engineering 3(3,0) See B E 428.

CHE 431 Process Development, Design, and Optimization of Chemical Engineering Systems I 3(2,3) Steps in creating a chemical process design from original concept to successful completion and operation of the plant. Topics include engineering economics, systems and analysis, simulation, optimization, process-equipment sizing, selection, and costing. *Preq:* CH E 307, 312. *Coreq:* CH E 413.

CHE 432 Process Development, Design, and Optimization of Chemical Engineering Systems II 5(1,12) [O.1, W.1] Continuation of CH E 431. Principles of process development, design, and optimization are applied in a comprehensive problem carried from a general statement of the problem to detailed design and economic evaluations. *Preq:* CH E 321, 353, 407, 413, and 450 or consent of department chair.

CHE 443 Chemical Engineering Senior Seminar I 1(1,0) Preparation of senior chemical engineering students for entry into the profession. Timely information on job interviewing skills, career placement and guidance, professional registration, professional behavior and ethics, and management of personal finances. Outside speakers are used frequently. To be taken Pass/Fail only. *Preq:* CH E 312, Senior standing in Chemical Engineering. *Coreq:* CH E 431.

CH E 444 Chemical Engineering Senior Seminar II 1(1,0) [O.1] Working in groups, students present and discuss topics related to professional practice, ethics, business, industrial safety, the environment, and selected technical subjects of interest to society. To be taken Pass/Fail only. *Preq:* CHE 344 or 443. *Coreq:* CH E 432.

CH E 445 Selected Topics in Chemical Engineering 3(3,0) Topics not covered in other courses, emphasizing current literature, research, and practice of chemical engineering. Topics vary from year to year. May be repeated, but only if different topics are covered. *Preq:* Consent of instructor.

CH E 450, 650 Chemical Reaction Engineering 3(3,0) Review of kinetics of chemical reactions and an introduction to the analysis and design of chemical reactors. Topics include homogeneous and heterogeneous reactions, batch and continuous flow reaction systems, catalysis, and design of industrial reactors. *Preq:* CHE 312, 321, CH 332.

CH E 491, H491 Special Projects in Chemical Engineering 1-3(1-3,0) Topics requested by students or offered by faculty as the need arises. Topics may include review of current research in an area, technological advances, and national engineering goals. May be repeated for a maximum of six credits, but only if different topics are covered.

CH E H495 Honors Research II 3(0,9) Individual research under the direction of a chemical engineering faculty member. *Preq:* CHE H395.

CH E H497 Honors Thesis 1(1,0) Preparation of honors thesis based on research conducted in CH E H395 and H495. *Preq:* CHE H495.

CHEMISTRY

Professors: R. A. Abramovitch, M. M. Cooper, S. E. Creager, D. D. DesMarceau, R. K. Dieter, L. Echegoven, *Chair*; J. W. Huffman, S.-J. Hwu, A. L. Kholodenko, J. W. Kolis, R. K. Marcus, W. T. Pennington, Y.-P. Sun; *Associate Professors:* J. R. Appling, D. Perahia, D. W. Smith, Jr.; *Assistant Professors:* D. P. Arya, J. Brumaghim, G. D. Chumanov, G. P. Goodyear, J. McNeill, S. J. Stuart; *Lecturers:* K. A. Creager, L. E. Echegoven, L. T. Eubanks, J. G. Kaup, A. Kitaygorodskiy; *Visiting Assistant Professor:* M. L. Doerr; *Visiting Instructor:* B. S. Lewis

CH 101, H101 General Chemistry 4(3,3) Introduction to the elementary concepts of chemistry through classroom and laboratory experience. Emphasizes chemical reactions and the use of symbolic representation, the mole concept and its applications and molecular structure. Credit toward a degree will be given for only one of CH 101 and 105. *Preq or Coreq:* MTHSC 105 or higher placement in MTHSC.

CH 102, H102 General Chemistry 4(3,3) Continuation of CH 101, treating solutions, rates of reactions, chemical equilibrium, electrochemistry, chemistry of selected elements, and an introduction to organic chemistry. Credit toward a degree will be given for only one of CH 102 or 106. *Preq:* CH 101 with a C or better.

- CH 105 Beginning General and Organic Chemistry 4(3,3)** Elementary treatment of principles of general and organic chemistry for students in liberal arts, education, business, health science, and selected life-science curricula. Laboratory is coordinated with lecture. May not be taken as a prerequisite for organic chemistry. Credit toward a degree given for only one of CH 101 or 105.
- CH 106 Beginning General and Organic Chemistry 4(3,3)** Continuation of CH 105. Topics in elementary organic chemistry with an emphasis on organic chemistry relevant to life processes are developed in both lecture and laboratory. May not be taken as a prerequisite for organic chemistry. Credit toward a degree will be given for only one of CH 102 or 106. *Preq:* CH 105 with a C or better or consent of instructor.
- CH 141 Chemistry Orientation 1(1,0)** Lectures, discussions, and demonstrations devoted to health and safety in chemistry laboratories; use of the chemical literature; and career planning. *Preq:* Registration in CH 101.
- CH 201 Survey of Organic Chemistry 4(3,3)** Introduction to organic chemistry emphasizing nomenclature, classes of organic compounds, and chemistry of functional groups; for students needing one-semester course in organic chemistry. Credit toward a degree will be given for only one of CH 201 or 223. *Preq:* CH 102 or consent of instructor.
- CH 205 Introduction to Inorganic Chemistry 2(2,0)** One semester treatment which emphasizes the properties and reactions of the more common chemical elements. *Preq/Correq:* CH 102.
- CH 206 Inorganic Chemistry Laboratory 1(0,3)** Introduction to laboratory synthesis and characterization of inorganic compounds. Laboratory sessions consist of a set of six landmark inorganic experiments for which the original authors have been awarded Nobel prizes. *Correq:* CH 102, 205.
- CH 223 Organic Chemistry 3(3,0)** Introductory course in the principles of organic chemistry and the derivation of these principles from a study of the properties, preparations, and interrelationships of the important classes of organic compounds. Credit toward a degree will be given for only one of CH 201 or 223. *Preq:* CH 102 or consent of instructor.
- CH 224 Organic Chemistry 3(3,0)** Continuation of CH 223. *Preq:* CH 223.
- CH 227 Organic Chemistry Laboratory 1(0,3)** Synthesis and properties of typical examples of the classes of organic compounds. Credit toward a degree will be given for only one of CH 225, 227, or 229. *Preq:* Registration in CH 223.
- CH 228 Organic Chemistry Laboratory 1(0,3)** Continuation of CH 227. Credit toward a degree will be given for only one of CH 226 or 228. *Preq:* CH 227 and registration in CH 224.
- CH 229 Organic Chemistry Laboratory 1(0,3)** One-semester laboratory for chemical engineering students. Credit toward a degree will be given for only one of CH 225, 227, or 229. *Preq:* CH 223.
- CH 313 Quantitative Analysis 3(3,0)** Fundamental principles of volumetric, gravimetric, and certain elementary instrumental chemical analyses. *Preq:* Concurrent enrollment for credit in CH 315 or 317.
- CH 315 Quantitative Analysis Laboratory 2(0,6)** Laboratory techniques of volumetric, gravimetric, and elementary instrumental chemical analyses. Credit toward a degree will be given for only one of CH 315 or 317. *Correq:* Concurrent enrollment for credit in CH 313.
- CH 317 Quantitative Analysis Laboratory 1(0,3)** Standard techniques of analytical chemistry—gravimetric, volumetric, and instrumental. Credit toward a degree will be given for only one of CH 315 or 317. *Correq:* Concurrent enrollment for credit in CH 313.
- CH 330 Introduction to Physical Chemistry 3(3,0)** One-semester treatment of physical chemistry, emphasizing topics that are especially useful in the life sciences, agriculture, and medicine: chemical thermodynamics, equilibrium, solutions, kinetics, electrochemistry, macromolecules, and surface phenomena. Credit toward a degree will be given for only one of CH 330 or 331. *Preq:* MTHSC 106.
- CH 331 Physical Chemistry 3(3,0)** Includes the gaseous state, thermodynamics, chemical equilibria, and atomic and molecular structure, from both experimental and theoretical points of view. Credit toward a degree will be given for only one of CH 330 or 331. *Preq:* MTHSC 206, PHYS 221.
- CH 332, H332 Physical Chemistry 3(3,0)** Continuation of CH 331, including chemical kinetics, liquid and solid state, phase equilibria, solutions, electrochemistry and surfaces. *Preq:* CH 331 or consent of instructor.
- CH 339 Physical Chemistry Laboratory 1(0,3)** Experiments are selected to be of maximum value to Chemistry and Chemical Engineering majors. *Correq:* CH 331 or CH E 220.
- CH 340 Physical Chemistry Laboratory 1(0,3)** Continuation of CH 339. *Preq:* Registration in CH 332.
- CH 402, H402, 602 Inorganic Chemistry 3(3,0)** Basic principles of inorganic chemistry are discussed with special emphasis on atomic structure, chemical bonding, solid state, coordination chemistry, organometallic chemistry, and acid-base theories. The chemistry of certain selected elements is treated. *Preq:* CH 331, 332.
- CH 411 Instrumental Analysis 3(3,0)** Principles of operation and application of modern chemical instrumentation in the field of analytical chemistry. Topics include basic electronics, statistics, optical, mass, magnetic resonance, electron and x-ray spectroscopies, radiochemistry, and separation science. *Preq:* CH 331, 332.
- CH 412 Instrumental Analysis Laboratory 2(0,5)** Reinforcement of principles of chemical instrumentation described in CH 411 by practical, hands-on experience. Aspects of sample preparation, standardization, data acquisition and interpretation, and report formulation procedures common in chemical analyses are considered for a range of modern instrumental methods. *Correq:* CH 411.
- CH 413, H413 Chemistry of Aqueous Systems 3(3,0)** Chemical equilibria in aqueous systems, especially natural waters; acids and bases, dissolved CO_2 , precipitation and dissolution, oxidation-reduction, adsorption, etc. *Preq:* CH 102 or 106.
- CH 421, H421, 621 Advanced Organic Chemistry 3(3,0)** Survey of modern organic chemistry with an emphasis on synthesis and mechanisms. *Preq:* CH 224, 332, or equivalent.
- CH 425, 625 Medicinal Chemistry 3(3,0)** Survey of the pharmaceutical drug discovery process. Covers discovery of candidate compounds, bioassay methods, and associated regulatory and commercial issues. Case studies are selected from the current literature. *Preq:* CH 224 or equivalent or consent of instructor.
- CH 427, H427, 627 Organic Spectroscopy 3(2,3)** Survey of modern spectroscopic techniques used in the determination of molecular structure. Emphasis is on the interpretation of spectra: nuclear magnetic resonance, ultraviolet, infrared, mass spectroscopy, optical rotatory dispersion and circular dichroism. *Preq:* One year each of organic chemistry and physical chemistry.
- CH 435, H435, 635 Atomic and Molecular Structure 3(3,0)** Introduction to quantum theory and its application to atomic and molecular systems. Topics include harmonic oscillator, hydrogen atom, atomic and molecular orbital methods, vector model of the atom, atomic spectroscopy, and molecular spectroscopy. *Preq:* CH 332 or consent of instructor.
- CH 443, H443 Research Problems 3(0,9)** Original investigation of an assigned problem in a fundamental branch of chemistry. Work must be carried out under the supervision of a member of the staff. *Preq:* Senior standing in Chemistry or consent of instructor.
- CH 444, H444 Research Problems 3(0,9)** Continuation of CH 443.
- CH 451, 651 Frontiers in Polymer Chemistry 3(3,0)** Survey of selected areas of current research in polymer science with particular emphasis on polymer synthesis. Although a text is required for review and reference, course is primarily literature-based and focused on areas of high impact to multi-disciplined technology. *Preq:* CH 223, 224, PTC 415 or consent of instructor.
- CH 471, 671 Teaching Chemistry 3(3,0)** Topics in chemistry addressed in the context of constructivist methodologies. Laboratory work and management, laboratory safety, and the use of technology in the chemistry classroom are also considered. *Preq:* 300-level chemistry course or high school teaching experience or consent of instructor.

CHINESE

Assistant Professors: Y. An, Y. Zhang

CHIN 101 Elementary Chinese 4(3,1) Introductory course stressing speaking, listening, and writing. Attention is given to the sound system of Chinese to enable students to distinguish the four tones and to develop basic communication skills. Participation in cultural activities is encouraged.

CHIN 102 Elementary Chinese 4(3,1) Continuation of CHIN 101. *Preq:* CHIN 101 or consent of instructor.

CHIN 201 Intermediate Chinese 3(3,1) Intermediate course with more emphasis on communication skills and structure. Reading and writing practice without phonetic aids; oral practice in and outside the class, paying special attention to idiomatic usage; introduction to cultural perspectives through readings and cultural activities. *Preq:* CHIN 102 or consent of instructor.

CHIN 202 Intermediate Chinese 3(3,1) Continuation of CHIN 201. *Preq:* CHIN 201 or consent of instructor.

CHIN 203 Chinese Reading and Composition I 4(3,1) Designed for students who already speak Chinese but cannot read and write it well. Covers grammatical points of first-year Chinese with special attention to reading and composition. *Preq:* Consent of instructor.

CHIN 204 Chinese Reading and Composition II 4(3,1) Continuation of CHIN 203. Covers all grammatical points of regular second-year Chinese. Through reading and discussion of materials regarding Chinese linguistics, history, literature, and philosophy, students improve their language skills and acquire a basic knowledge of Chinese culture. *Preq:* CHIN 203 or consent of instructor.

CHIN 305 Chinese Conversation and Composition I 3(3,0) Practice in the spoken language with emphasis on vocabulary, word-combinations, pronunciation, and comprehension. Learning practical language skills and intercultural communication by studying various topics. *Preq:* CHIN 202, 204, or consent of department chair.

CHIN 306 Chinese Conversation and Composition II 3(3,0) Continuation of CHIN 305. More practice in the spoken language with emphasis on vocabulary, word combinations, pronunciation, and comprehension. Learning practical language skills and intercultural communication by studying various topics. *Preq:* CHIN 305 or consent of department chair.

CHIN (PHIL) 312 Philosophy in Ancient China 3(3,0) See PHIL 312.

CHIN (PHIL) 313 Philosophy in Modern China 3(3,0) See PHIL 313.

CHIN 316 Chinese for International Trade I 3(3,0) Study of spoken and written Chinese common to the Chinese-speaking business communities, with emphasis on business practices and writing/translating business letters and professional documents. Cross-cultural references are provided for comparative analyses of American and Chinese business behavior. Classes are conducted in Chinese. *Preq:* CHIN 202, 305 (or concurrent enrollment) or consent of department chair.

CHIN 398 Directed Reading 3(3,0) Directed readings in Chinese literature, language, society, and culture. Taught in Chinese. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

CHIN 416 Chinese for International Trade II 3(3,0) Study of language, concepts, and the environment of Chinese-speaking markets of the world. Sociocultural, political, and economic issues relevant to the Chinese-speaking business world and the ramifications of these issues in global marketing. Classes are conducted in Chinese. *Preq:* CHIN 316 or consent of department chair.

CHIN (ANTH) 418 Chinese Culture and Society 3(3,0) Examines basic cultural values and the patterns of Chinese social life. Focus is on Chinese social organization and interpersonal dynamics, including the family system, gender identities, social exchanges and networks. All readings and discussions are in English. May not be used to satisfy general foreign language requirements.

CHIN 499 Selected Topics in Chinese Culture 3(3,0) Examination of various social and cultural topics including art and literature, philosophical and religious traditions, health and healing, and folk and popular cultures. May be repeated for a maximum of six credits, but only if different topics are covered. Readings and discussions are in English. May not be used to satisfy general foreign language requirements.

CITY AND REGIONAL PLANNING

Professors: J. B. London, M. Lauria, D. J. Nadenicek, *Chair;* B. C. Nocks; *Associate Professors:* M. G. Cunningham, J. T. Farris, S. L. Sperry; *Visiting Assistant Professor:* C. A. Schively; *Lecturer:* R. W. Bainbridge; *Adjunct Professor:* G. A. Vander Mey

C R P 401, 601 Introduction to City and Regional Planning 3(3,0) Introduces students from other disciplines to City and Regional Planning. Spatial and nonspatial areas of discipline are explored through a wide ranging lecture/seminar program. *Preq:* Consent of instructor.

C R P 402, 602 Human Settlement 3(3,0) Overview of forces and trends affecting community growth and change—historical, ecological, economic, demographic, design, and development—pertaining to human settlement patterns and their interrelationship in the urbanization process, especially at the national, regional, townscape, and neighborhood scale. Team-taught from various perspectives. Intended as a foundation core course for Master's in Real Estate Development, City and Regional Planning, and Landscape Architecture. *Preq:* Consent of instructor.

C R P 403, 603 Seminar on Planning Communication 3(3,0) [W.2] In-depth analysis of methods to communicate planning and policy decisions effectively; attempts to familiarize students with the various communication skills needed by planners, policy makers, and other professionals to become successful practitioners. *Preq:* Consent of instructor.

C R P (E N R) 434, 634 Geographic Information Systems for Landscape Planning 3(1,6) Develops competence in geographic information systems technology and its application to various spatial analysis problems in landscape planning. Introduces basic principles of GIS and their use in spatial analysis and information management. Topics include database development and management, spatial analysis techniques, cartography, critical review of GIS applications, and hands-on projects.

CIVIL ENGINEERING

Professors: S. N. Amirkhanian, S. C. Anand, N. M. Aziz, *Chair;* L. C. Bell, R. H. Brown, J. L. Burati, C. H. Juang, R. F. Nowack, T. A. Reinhold, S. D. Schiff, P. R. Sparks; *Associate Professors:* W. E. Back, W. A. Sarasua; *Assistant Professors:* R. D. Andrus, D. B. Clarke, A. A. Khan, P. R. Rangaraju, D. E. Werth, Jr.; *Lecturer:* S. F. Csernak

C E 200 Structural Mechanics 4(3,3) Builds on statics to develop relationships between external loads on structural elements of civil engineering interest and the resulting internal loads and deformations. Students are exposed to the development of stress and deformation formulas and the identification and use of significant mechanical properties of civil engineering materials. *Preq:* E M 201. *Coreq:* C E 253.

C E 251 Analytical Techniques in Civil Engineering 3(2,3) [C.1] Solution to civil engineering problems using the techniques of dimensional analysis, data analysis, and numerical analyses. The latter includes introduction to FORTRAN programming, simulation analysis, and the numerical solution of systems of linear algebraic equations. *Preq:* ENGR 120. *Coreq:* MTHSC 206.

C E 253 Civil Engineering Measurements 2(3,0) Principles and methods for measurement of loads, load effects, environmental variables, and performance of civil engineering systems. Classes integrate lectures and hands-on applications. Exercises provide students an introduction to sensors, basic electrical circuits, data acquisition systems, and data analysis methods used in civil engineering.

C E 255 Geomatics 3(2,3) Spatial data collection methods including surveying, digital photogrammetry and remote sensing, and global positioning systems. Methods and technologies used to manage, manipulate, and analyze spatial and associated attribute data including geographic information systems.

C E 301 Structural Analysis 3(2,2) Calculation of design loads for buildings and other structures. Use of classical analysis techniques to determine support reactions, internal member forces, and structural displacements of statically determinate and indeterminate structural systems. *Preq:* C E 200 or consent of instructor.

C E 311 Transportation Engineering Planning and Design 3(3,0) Planning, design, and operation of transportation facilities including highways and airports. Coverage includes economic, safety, and environmental considerations. Public transit systems are covered. *Preq:* C E 255, EX ST 301.

C E 321 Geotechnical Engineering 4(3,3) Mechanical and physical properties of soils and their relation to soil action in problems of engineering, such as classification, permeability, shearing strength, and consolidation; design of embankments and retaining walls with geotextiles. *Preq:* C E 200, 253.

C E 331 Construction Engineering and Management 3(3,0) Construction contracts, technical specifications, cost estimating, project scheduling, cost control, materials management, quality control, and quality assurance. *Preq:* Junior standing.

- C E 341 Introduction to Fluid Mechanics 4(3,3)** Introduction to fluid mechanics, including properties of static and dynamic situations. Problem-solving skills are emphasized, including the principles of mass, momentum, and energy conservation. Special topics include conduit flows and pump systems. Laboratory experiments familiarize students with laboratory techniques and instrumentation. *Preq:* C E 253, E M 202, Junior standing.
- C E 342 Applied Hydraulics and Hydrology 3(3,0)** Concepts covered are pipe network design, precipitation, evapotranspiration, runoff, hydrograph analysis, flood routing, hydrologic design, open channel flow, design of stable channels, and groundwater hydraulics. A design project involving hydrologic system analysis and design is assigned. *Preq:* C E 341, EX ST 301.
- C E 350 Economic Evaluation of Projects 3(3,0) [O.1]** Comparison of design alternatives based on engineering economic analysis. Introduction of present worth, annual cost, rate of return, and benefit-cost ratio methods. Use of depreciation and taxation in project analysis. Students make oral presentations of historic and current civil engineering projects. *Preq:* Junior standing.
- C E 351 Civil Engineering Materials 3(2,3)** Basic properties of aggregates, Portland cement, and asphalt cement. Classification of aggregates on the basis of size and strength. Properties of Portland cement and asphalt concrete mixtures, mix design procedures, field control and adjustments. Properties of steel and wood. Field trips to nearby plants. *Preq:* C E 253. *Coreq:* C E 200 and EX ST 301.
- C E 352 Economic Evaluation of Projects 2(3,0)** Comparison of design alternatives based on engineering economic analysis. Introduction of present worth, annual cost, rate of return, and benefit-cost ratio methods. Use of depreciation and taxation in project analysis. *Preq:* Junior standing.
- C E 353 Professional Seminar 1(1,0)** Various professional topics related to skills and techniques for evaluating career opportunities, seeking and obtaining civil engineering employment, career development, professional registration, professional ethics, and other factors necessary for achieving success in a professional career. Enables students to make better decisions that will help them succeed in their careers. *Preq:* Junior standing.
- C E H387 Junior Honors Project 1-3 Studies** or laboratory investigations on special topics in the civil engineering field which are of interest to individual students and faculty members. Arranged on a project basis for a maximum of individual student effort under faculty guidance. May be repeated for a maximum of three credits. *Preq:* Junior standing in Civil Engineering Senior Departmental Honors Program.
- C E H388 Honors Research Topics 1(0,2)** Survey of ongoing research in the Civil Engineering Department to identify potential research topics for further individual study. *Preq:* Junior standing in Civil Engineering Senior Departmental Honors Program.
- C E H389 Honors Research Skills 1(1,0)** Research problem selection, research tools, research reports organization. *Preq:* C E H388.
- C E 401 Indeterminate and Matrix Structural Analysis 3(3,0)** Analysis of indeterminate structures using moment distribution, energy methods such as virtual work and Castigliano's Theorem, and the matrix formulation of the direct stiffness method. *Preq:* C E 301 or consent of instructor.
- C E 402 Reinforced Concrete Design 3(3,0)** Design of reinforced concrete beams, slabs, columns, and footings using ultimate strength design. An introduction to working stress design methods is included. *Preq:* C E 301 or consent of instructor.
- C E 404, 604 Wood and Masonry Structural Design 3(3,0)** Introduction to design of structural elements for masonry buildings. Lintels, walls, shear walls, columns, pilasters, and retaining walls are included. Reinforced and unreinforced elements of concrete or clay masonry are designed by allowable stress and strength design methods. Introduction to construction techniques, materials, and terminology used in masonry. *Preq:* C E 402 or consent of instructor.
- C E 405, 605 Structural Systems Design 3(3,0)** Study of the structural design process including structural requirements, structural systems and materials, specification of loads, and the preliminary design and costing of structural components and systems. *Preq:* C E 301 or consent of instructor.
- C E 406 Structural Steel Design 3(3,0)** Introduction to the design of structural elements found in steel buildings, in particular the design of steel tension members, beams, columns, beam-columns, and connections. Additional topics include composite members and plate-girders. Emphasis is on the AISC-LRFD Specification for steel design, though reference is made to the ASD Specification with comparisons made where appropriate. *Preq:* C E 301 or consent of instructor.
- C E 407, 607 Wood Design 3(3,0)** Introduction to wood design and engineering; properties of wood and wood-based materials; design of beams, columns, walls, roofs, panel systems, and connections. *Preq:* C E 300 and 402 or 406.
- C E 410, 610 Traffic Engineering: Operations 3(3,0)** Basic characteristics of motor-vehicle traffic, highway capacity, applications of traffic control devices, traffic design of parking facilities, engineering studies, traffic safety, traffic laws and ordinances, public relations. *Preq:* C E 311.
- C E 411, 611 Roadway Geometric Design 3(2,3)** Geometric design of roadways, at-grade intersections, and interchanges in accordance with conditions imposed by driver ability, vehicle performance, safety, and economics. *Preq:* C E 311.
- C E 412, 612 Urban Transportation Planning 3(3,0)** Urban travel characteristics, characteristics of transportation systems, transportation and land-use studies, trip distribution and trip assignment models, city patterns and subdivision layout. *Preq:* C E 311.
- C E 421, 621 Geotechnical Engineering Design 3(3,0)** Relationship of local geology to soil formations, groundwater, planning of site investigation, sampling procedures, determination of design parameters, foundation design, and settlement analysis. *Preq:* C E 321.
- C E 424, 624 Earth Slopes and Retaining Structures 3(3,0)** Principles of geology, groundwater and seepage, soil strength, slope stability, and lateral earth pressure and their application to the design of excavations, earth fills, dams, and earth-retaining structures. *Preq:* C E 321 or GEOI 320 or equivalent.
- C E 433, 633 Construction Planning and Scheduling 3(3,0)** Principles and applications of the Critical Path Method (CPM) and Project Evaluation and Review Techniques (PERT). Project breakdown and network graphics. Identification of the critical path and resulting flows. Definition and allocation of materials, equipment, and manpower resources. Resource leveling, compression, and other network adjustments. Computer applications using packaged routines. *Preq:* C E 331.
- C E 434, 634 Construction Estimating and Project Control 3(3,0)** Specifications, contracts, and bidding strategies; purchasing and subcontracting policies; accounting for materials, supplies, subcontracts, and labor; procedural details for estimating earthwork, reinforced concrete, steel, and masonry. Overhead and profit items. *Preq:* C E 331 or equivalent.
- C E 438, 638 Construction Support Operations 3(3,0)** Describes activities necessary for the completion of a construction job although not specifically recognized as direct construction activities: general conditions, safety, security, quality assurance, value engineering; organizational support features and typical implementation procedures. *Preq:* C E 331, EX ST 301.
- C E 446, 646 Flood Hazards and Protective Design 3(3,0)** Study of flood hazards and methods of protective design of the built environment. Floodplain mapping and delineation. Methods for determining base flood elevations. Flood-resistant construction, flood proofing, and governmental regulations are discussed. Includes case studies and design projects. *Coreq:* C E 342.
- C E 447, 647 Stormwater Management 3(3,0)** Evaluation of peak discharges for urban and rural basins, design of highway drainage structures such as inlets and culverts; stormwater and receiving water quality; best management practices, detention and retention ponds, and erosion and sediment control. *Preq:* C E 342; *Coreq:* EE&S 401 or consent of instructor.
- C E 448, 648 Physical Models in Hydraulics 3(2,3)** Tools and techniques of physical modeling to aid in design of complex hydraulic systems. Students participate in construction, operation, and testing of physical models to solve hydraulic engineering design problems. Experimental design and operation are covered. *Preq:* C E 341 and 342 or consent of instructor.
- C E 449 649 Hydraulic Structures 3(3,0)** Design methods and procedures are taught for a variety of hydraulic structures including intake structures, complex open-channel and closed conduit control structures, transitions, spillways, small dam, and pond design. Field trips to actual hydraulic structures may be included. *Preq:* C E 341 and 342 or consent of instructor.

C E 455, 655 Properties of Concrete and Asphalt 3(2,3) Properties of aggregate, concrete, and asphalt are discussed. Concrete and asphalt mix designs are conducted in the laboratory. *Preq:* C E 200, 351, EX ST 301 or MTHSC 302.

C E 459 Capstone Design Project 3(1,6) Students apply creativity with their engineering knowledge in the solution of open-ended civil engineering problems. Problems are formulated and solutions are evaluated by faculty and practicing engineers. Oral communication skills are developed through presentations, correspondence, and project reports. *Preq:* All required 300-level C E courses and the Technical Design Requirement.

C E 462, 662 Coastal Engineering I 3(3,0) Introduction to coastal and oceanographic engineering principles, including wave mechanics, wave-structure interaction, coastal water-level fluctuations, coastal-zone processes, and design considerations for coastal structures and beach nourishment projects. *Preq:* C E 341 or E M 320.

C E 482, 682 Groundwater and Contaminant Transport 3(3,0) Basic principles of groundwater hydrology and transport of contaminants in groundwater systems; groundwater system characteristics; steady and transient flow; well hydraulics, design, and testing; contaminant sources, movement and transformations. *Preq:* C E 341. *Coreq:* EE&S 401.

C E H487 Senior Honors Project 1-3 Studies or laboratory investigations on special topics in civil engineering which are of interest to individual students and faculty members. Arranged on a project basis for a maximum of individual student effort under faculty guidance. May be repeated for a maximum of three credits. *Preq:* Senior standing in Civil Engineering Senior Departmental Honors Program.

C E H488 Senior Research I 2-3 Individual research under the direction of a Civil Engineering faculty member. *Preq:* C E H389.

C E H489 Honors Research II 3(3,0) Individual research under the direction of a Civil Engineering faculty member. *Preq:* C E H488

C E 490, 690 Special Projects 1-3(1-3,0) Studies or laboratory investigations on special topics in the civil engineering field which are of interest to individual students and staff members. Arranged on a project basis with a maximum of individual student effort and a minimum of staff guidance. May be repeated for a maximum of three credits. *Preq:* Senior standing.

C E 491, 691 Selected Topics in Civil Engineering 1-6(1-6,0) Structured study of civil engineering topics not found in other courses. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

CLEMSON UNIVERSITY

C U 101 University Success Skills 2(3,0) A variety of topics critical to students' success is introduced. Topics include time management, goal setting, test taking, campus resources and policies, critical thinking, and diversity. Students are given opportunities to discover and practice many procedures, techniques, and tips. Limited to freshmen and first semester transfer students.

COLLEGE OF ENGINEERING AND SCIENCE

CES 101 Introduction to Engineering and Science 1(0,2) Introduction to the engineering and science professions to assist students in their selection of a major. In addition, inventories are used to assess career interests and learning styles. Students also complete and demonstrate several minidesign projects. Credit may be received for only one of CES 101 or ENGR 101.

CES 102 Engineering Disciplines and Skills 2(1,2) Introduction to the engineering profession and science disciplines for the purpose of assisting students in the selection of a major. Students use laptop computers to study spreadsheets, obtain graphical solution of problems, produce design project reports, and respond to various online surveys. Students complete two team-based design projects.

CES 110 Engineering and Science Workshop 1(0,2) Workshop that addresses issues and opportunities for women in science and engineering. Designed to help students succeed in engineering and science by strengthening their problem-solving, leadership, and teamwork skills and by introducing them to female role models and mentors in engineering and science.

COMMUNICATION STUDIES

Professor: K. W. Hawkins, *Chair*; *Associate Professors:* D. S. Geddes, S. J. Madden; *Assistant Professors:* A. C. Billings, P. J. Bowers, B. E. Denham, N. S. Jackson, K. O. Jones, D. W. Wiesman, J. Yin; *Lecturers:* C. O. Bishop, A. Cowden, M. H. Glaser, K. M. Lauridsen, C. T. Parrott, C. S. Parsons, C. D. Raj, E. R. Smith

COMM 150 Introduction to Speech Communication 3(2,2) [O.3] Overview of theoretical approaches to the study of communication, including the theory and practice of interpersonal/small group/intercultural/public communication. Students complete a portfolio. Includes a laboratory.

COMM 162 Forensic Laboratory 1(0,3) Research, preparation, and practice leading to participation in on-campus and intercollegiate debate and individual events competition. May be repeated for a maximum of four credits.

COMM 163 Advanced Forensic Laboratory 1(0,3) Advanced research, preparation, and practice leading to continued participation in on-campus and intercollegiate debate and individual events competition. May be repeated for a maximum of four credits. *Preq:* COMM 162.

COMM 201 Introduction to Communication Studies 3(3,0) Introduces and prepares students for continued study in their major by familiarizing them with the evolution of the communication discipline. Students are exposed to those major theoretical approaches and traditional research practices that characterize contemporary communication scholarship.

COMM 250, H250 Public Speaking 3(3,1) [O.3] Practical instruction in public speaking; practice in the preparation, delivery, and criticism of short speeches. Develops an understanding and knowl-

edge of the process of communication. Students complete a portfolio. Includes a laboratory.

COMM 251 Business and Professional Speaking 3(3,0) [O.3] Skills-intensive course for researching, organizing, and delivering speeches for business and professional settings.

COMM 256 Introduction to Public Relations 3(3,0) Students learn the context and techniques of public relations (PR), a form of corporate communications. Types of PR work, theories of PR, the four-part structure of PR, and the history of the field.

COMM 268 Voice and Diction 3(3,0) Practical work to improve vocal clarity and tonal quality of students' speech. Corrects such voice and diction problems as improper enunciation and extreme dialects.

COMM 300 Communication in a World Context 3(3,0) In-depth examination of differences in communication practices and meanings seen through a global perspective. *Preq:* COMM 150, 250, or consent of instructor.

COMM 301 Speech Communication Theories 3(3,0) Various theories and models of communication characterizing the field of speech communication. Focuses on how communication is conceptualized from different theoretical perspectives.

COMM 302 Mass Communication Theory 3(3,0) Survey of the breadth and history of theories of mass communication and mass media from the 19th century to the present. Especially emphasizes contemporary schools of thought, theoretical debates, and the continuing controversies in the field.

COMM 310 Communication Research Methods 3(3,0) Students study methods of communication research, preparing research projects, conducting research studies, ethnography, observation, sampling, measurement, analysis, and the relationship between theory and research.

COMM 320 Television Journalism 3(2,2) Explores both the philosophy of journalism and the applied skills of the journalist. In addition to classroom activities, students experience television journalism first-hand as participants on a weekly on-campus television news program.

COMM 325 Sports Communication 3(3,0) Fundamentals of communicating in a sports environment. The basics of communicating for print and broadcast news, as well as communicating for public relations and sports information. Ethical considerations and the role of sports in American culture are covered. *Preq:* COMM 201.

COMM 326 Public Relations in Sports 3(3,0) Focuses on the preparation of professional sports communication materials for both internal and external audiences. Topics include the mechanics of creating press releases and other materials, as well as techniques in managing crises.

COMM 327 Sports Media Criticism 3(3,0) Students gain in-depth understanding of sports communication issues through critically analyzing actual media coverage of sporting events, addressing social issues involved in college and professional sports, and developing an understanding of sports promotion and advertising.

COMM 330 Nonverbal Communication 3(3,0)
Develops a knowledge of the functions of nonverbal behaviors in human interaction. This includes the study of gesture and movement, physical appearance, vocal behavior, immediacy, time and space, and intercultural differences. Promotes understanding of nonverbal roles.

COMM 348 Interpersonal Communication 3(3,0)
Survey of the theories and research in interpersonal communication with emphasis on the application of research findings and developmental strategies for intra- and inter-cultural relationships.

COMM 349 Communication and Aging 3(3,0)
Major theories and concepts concerning communication with and between members of aging populations. Focus on communication factors that affect the elderly and implication for the creation and maintenance of satisfying relationships within and between generations.

COMM 350 Small Group and Team Communication 3(3,0)
Examines the principles and skills involved in effective small-group communication.

COMM 356 Stakeholder Communication 3(3,0)
Focuses on external stakeholders such as the media, the community, and the government. Students learn how to manage various stakeholder relationships. *Preq:* Junior standing.

COMM 360 Persuasion 3(3,0)
Theories of persuasion and propaganda. Practical instruction in analysis and construction of persuasive messages. *Preq:* COMM 250.

COMM 361 Argumentation and Debate 3(3,0)
Basic principles of argumentation with emphasis on developing skills in argumentative speech. The role of the advocate in contemporary society with an emphasis on and an appreciation of formal debate. *Preq:* Consent of instructor.

COMM 363 Oral Interpretation of Literature 3(3,0)
Analysis and oral interpretation of selected poetry and prose; training in development of effective tone production.

COMM 364 Organizational Communication 3(3,0)
Examination of the process, theories, and techniques of communications within small groups and other organized bodies.

COMM 366 Special Topics in Speech 3(3,0)
Consideration of select major areas of study in speech. May be repeated for a maximum of 15 credits with consent of department chair.

COMM 367 Negotiations Communication 3(3,0)
Develops a knowledge of the basic strategies and elements of communication used in effective negotiation. Includes techniques of dealing with people, interests, options, and the criteria necessary to reach agreements and objectives.

COMM 368 Organizational Communication Simulation 3(3,0)
Students develop and apply communication skills which are useful in a variety of organizational settings: taking and conducting interviews, group decision making, and oral reporting. Discusses communication processes and provides personal and professional development. *Preq:* COMM 250 or consent of instructor.

COMM 369 Political Communication 3(3,0)
Examination of American political rhetoric after 1900, focusing on such notable speakers as Franklin D. Roosevelt, John F. Kennedy, and Martin Luther King, Jr.

COMM 390 Speech and Communication Studies Internship 3(0,9)
Preplanned, preapproved, faculty-supervised internship provides Communication Studies majors with field experience in areas related to their curriculum. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Preq:* Junior standing, consent of faculty advisor.

COMM (LANG) 400 Phonetics 3(3,0)
See LANG 400.

COMM 402 Mass Communication: History and Criticism 3(3,0)
Critical examination of mass communication in America, including discussions of history, theory, and current issues in television, film, popular music, telecommunications, and other media.

COMM 425 Advanced Sports Communication 3(3,0)
Combination seminar and primary research class that explores contemporary sports communication issues. Students write position papers on seminar topics and conduct primary research on sports communication topics of their choice. *Preq:* COMM 325 or consent of instructor.

COMM 455 Gender Communication 3(3,0)
Explores the ways communication behavior and perceptions of communication behavior are affected by gender. The effects of gender on a variety of communication contexts are examined, including interpersonal, small group, organizational, and mass communication.

COMM 456, 656 Crisis Communication 3(3,0)
In-depth examination of the use of communication in planning, managing, and responding to organizational crisis. *Preq:* Senior standing or consent of instructor.

COMM 460 Communication and Conflict Management 3(3,0)
Introduces the study of communication practices in conflict situations within various personal and professional settings. Emphasis is on the central role of communication in the understanding and management of conflict. *Preq:* COMM 150 or 250 or consent of instructor.

COMM 464, 664 Advanced Organizational Communication 3(3,0)
Application of speech communication methodology to the analysis of organizational communication processes. Students study methods of organizational communication analysis and intervention. *Preq:* COMM 364 or consent of instructor.

COMM 470, 670 Communication and Health 3(3,0)
Considers institutional and health-care communication issues as well as the relationship between social issues, communication, and health.

COMM 480 Intercultural Communication 3(3,0)
Introduces the process of communication between and among individuals from different cultures or subcultures. Emphasis is on the effect of cultural practices within various communication relational contexts such as interpersonal, small group, and organizational communication. *Preq:* COMM 150 or 250 or consent of instructor.

COMM (ENGL) 491, 691 Classical Rhetoric 3(3,0)
See ENGL 491.

COMM (ENGL) 492, 692 Modern Rhetoric 3(3,0)
See ENGL 492.

COMM H493 Honors Prospectus Project 1(1,0)
Completion of an honors project proposal and a prospectus meeting with a faculty committee. First in a three-course sequence with H494 and H496.

COMM H494 Honors Field Research 3(0,9)
Honors students majoring in Communication Studies pursue field work with an outside organization related to concentration area in the major, gathering data for use in preparing original research project for COMM H496. Second in a three-course sequence with H493 and H496. *Preq:* COMM H493.

COMM 495 Senior Communication Seminar 3(3,0)
Students apply their knowledge and education to a significant research project involving the student's communication research interest. Project(s) culminate in a written document and a public presentation/discussion of the student's research. *Preq:* COMM 301, 310.

COMM H496 Honors Senior Communication Seminar 3(3,0)
Plans developed in COMM H493 and data gathered from COMM H494 are applied to the production of a written product of conference or publication length and quality. Third in a three-course sequence with H493 and H494. *Preq:* COMM H493, H494.

COMM 499 Independent Study 1-3(1-3,0)
Tutorial work for students with special interests or projects in speech communication outside the scope of existing courses. *Preq:* Consent of department chair.

COMMUNITY AND RURAL DEVELOPMENT

(See also courses listed under Agricultural and Applied Economics.)
Professors: D. L. Barkley, M. S. Henry, J. C. O. Nyankori, C. M. Sieverdes, *Associate Professor:* M. Espery, *Assistant Professor:* S. R. Templeton

C R D (SOC) 235 Introduction to Leadership 3(3,0)
See SOC 235.

C R D 335 Leadership in Organizations and Communities 3(3,0)
Students present leadership models, principles, skills, negotiation techniques, and practices to improve effectiveness in organizations and communities; use current theory and research findings to evaluate effective leadership; demonstrate the role of effective leadership in shaping future organizations and social structures in public and private sectors. *Preq:* Introductory course in a social science. (Sociology is recommended.)

C R D 336 Community Development Methods 3(3,0)
Research methodology is applied to community, leadership, and economic development. Steps include problem identification, data collection, analysis, and interpretation. Special attention is given to case study approach, applied research design, data collection options, and computer-based analysis of community-based data to generate findings and implications for policy change. *Preq:* C R D 335, EX ST 301 or equivalent.

C R D 357 Natural Resources Economics 3(3,0)
Principles and problems involved in the use of soil, water, forest, and mineral resources, with special emphasis on economic aspects of alternative methods of resource utilization. *Preq:* APEC 202, ECON 200 or 211.

C R D (AP EC, HLTH) 361 Introduction to Health-Care Economics 3(3,0) Introductory course in which students learn the basic economics of the institutions comprising the health-care industry. Topics include the underlying supply, demand, and institutional factors impacting health-care availability and cost of health care.

CRD (APEC) 411, 611 Regional Impact Analysis 3(3,0) Techniques for analysis of the growth and decline of regions including economic-base theory, shift share, regional input-output, regional econometric models, and fixed impact models. *Preq:* AP EC 202 or ECON 211 and 212.

C R D (AP EC) 412, 612 Regional Economic Development Theory and Policy 3(3,0) Development of rural economic activity in the context of historical, theoretical, and policy aspects of friction associated with spatial separation. Location factors, transfer costs, location patterns, and regional-growth policy are considered. *Preq:* AP EC 202 or ECON 211 or equivalent.

C R D (AP EC) 491 Internship, Agribusiness, and Community and Rural Development 1-6(0,12) Internship under faculty supervision in an approved agency or firm. Internships are designed to provide students with work experience in agribusiness or community and rural development. Students submit a comprehensive report within one week of the end of the internship. A maximum of six internship credits may be earned. *Preq:* Junior standing and/or consent of instructor.

C R D 492, 692 Case Study Project 3(3,0) Capstone course engaging students in in-depth case study projects in community and economic development. Designed to enhance professional development, career interests, and practical experience. Students may participate in an internship, field experience, service learning activity, or investigation of a community, leadership, or economic development topic. *Preq:* C R D 336 and consent of instructor.

COMPUTER SCIENCE

Professors: R. M. Geist III, S. M. Hedetniemi, S. T. Hedetniemi, D. P. Jacobs, P. K. Srimani, *Chair:* J. M. Westall, Jr., *Associate Professors:* A. T. Duchowski, W. Goddard, H. C. Grossman, E. O. Hare, A. W. Madison, B. A. Malloy, J. D. McGregor, R. P. Pargas, M. Sitaraman, M. K. Smotherman, D. E. Stevenson; *Assistant Professors:* T. A. Davis, J. O. Hallstrom, J. J. Martin, Z. Wang, M. C. Weigle; *Lecturers:* J. H. Jones, R. S. Lambert, R. M. Lowe, C. E. Pellerin, H. A. Pellerin, P. D. Sterling; *Visiting Lecturer:* C. Hochrime

CP SC 101, H101 Computer Science I 4(3,2) [C.3] Introduction to modern problem solving and programming methods. Special emphasis is placed on algorithm development and software life cycle concepts. Includes use of appropriate tools and discusses ethical issues arising from the impact of computing upon society. Intended for students concentrating in computer science or related fields. *Preq:* MTHSC 105 or satisfactory score on the Clemson Mathematics Placement Test or consent of instructor.

CP SC 102, H102 Computer Science II 4(3,2) Continuation of CP SC 101. Continued emphasis on problem solving and program development techniques. Typical numerical, nonnumerical, and data processing problems are examined. Basic data structures are introduced. Credit may not be received for both CP SC 102 and 210. *Preq:* CP SC 101 with a C or better.

CP SC 104 Introduction to the Concepts and Logic of Computer Programming 2(1,2) Introduction to the concepts and logic of computer programming. Simple models are used to introduce basic techniques for developing a programmed solution to a given problem. Problem solving techniques are considered. Not open to students who have received credit for CP SC 101, 111, 157, or 210.

CP SC 110, H110 Elementary Computer Programming 3(3,0) [C.3] Introduction to computer programming and its use in solving problems, intended primarily for technical majors. Basic instruction in programming techniques is combined with tools use and discussions of ethical issues arising from the impact of computing on society.

CP SC 111 Elementary Computer Programming in C/C++ 3(2,2) [C.3] Introduction to computer programming in C/C++ and its use in solving problems. Intended primarily for technical majors. Basic instruction in programming techniques is combined with tools use and discussions of ethical issues arising from the impact of computing on society.

CP SC 120 Introduction to Information Technology 3(2,2) [C.3] Investigation of ethical and societal issues based on the expanding integration of computers into our everyday lives. Historical background, terminology, new technologies and the projected future of computers are considered. Practical experience with common computer software technologies is included. Will not satisfy computer science requirements in any computer science major.

CP SC 157 Introduction to C Programming 2(2,0) Introduction to basic programming techniques. The C programming language is used.

CP SC 161 Introduction to Visual Basic Programming 3(2,2) Introduction to programming using the Visual Basic language. Topics include simple and complex data types, arithmetic operations, control flow, files, and database programming. Several projects are implemented during the semester.

CP SC 210 Programming Methodology 4(3,2) [C.3] Introduction to programming techniques and methodology. Topics include structured programming, stepwise refinement, program design and implementation techniques, modularization criteria, program testing and verification, basic data structures, and analysis of algorithms. Credit may not be received for both CP SC 102 and 210. *Preq:* CP SC 111 or equivalent; satisfactory performance on a pretest.

CP SC 212 Algorithms and Data Structures 4(3,2) Study of data structures and algorithms fundamental to computer science; abstract data type concepts; measures of program running time and time complexity; algorithm analysis and design techniques. Credit may not be received for both CP SC 212 and 340. *Preq:* CP SC 102 or 210 with a C or better.

CP SC 215 Tools and Techniques for Software Development 3(2,2) Intensive course on software development using an imperative language. Topics include typical program development tools such as debuggers and "make" files, software development and testing techniques such as separate module development and testing, pointers and explicit heap management, and low-level file I/O. *Preq:* CP SC 102 or 210 with a C or better.

CP SC 220 Microcomputer Applications 3(3,0) Applications of microcomputers to formulate and solve problem models. Emphasis is placed on applications development in database and spreadsheet environments. Current software products are used. *Preq:* CP SC 120 or MGT 218 or equivalent experience.

CP SC 221 Introduction to a Computer Organization 1(0,2) Introduction to the systems programming environment; languages and interfaces for programming operating systems tasks; use of the C programming language and UNIX operating system. *Preq:* CP SC 102 or 210 with a C or better.

CP SC 231 Introduction to Computer Organization 4(3,2) Study of the machine architectures on which algorithms are implemented; requirements of architectures that support high-level languages, programming environments, and applications. *Preq:* CP SC 102 or 210 with a C or better.

CP SC 281 Selected Topics in Computer Science 1-4(0-3,0-6) Areas of computer science in which new trends arise. Innovative approaches to a variety of problems in the use and understanding of basic computing concepts are developed and implemented. May be repeated for a maximum of eight credits, but only if different topics are covered. *Preq:* Consent of instructor.

CP SC 291 Seminar in Professional Issues I 1(1,0) Impact of computer use on society is considered. Ethical use of software and protection of intellectual property rights are discussed. The profession is viewed historically; organizations important to the profession are discussed; the development process for standards is presented; and students are introduced to the professional literature. *Preq:* CP SC 102 or 210, or consent of instructor.

CP SC 330 Computer Systems and Networks 3(3,0) Introduction to the structure of computer systems and networks. Various hardware/software configurations are explored and presented. Topics include basic computer organization, input/output organizations, interrupt processing, system software, standard network architectures and network protocols. *Preq:* CP SC 212, 215, 231, and ECE 201 with a C or better.

CP SC 332 Computer Systems 3(3,0) Introduction to design, integration, and use of hardware and software components in standard computer systems. Emphasis is on computer organization at the component level, interfacing, basic operating system functions, and system utilities. Credit may not be received for both CP SC 332 and 422. *Preq:* CP SC 212, 215, 231 with a C or better.

CP SC 340 Algorithms and Data Structures 3(3,0) Basic concepts of data structures such as queues, stacks, and lists; methods of proof as they relate to program verification; sets, functions, and relations as they relate to the analysis of algorithms. Includes the study of algorithms, time complexity, and design techniques. Credit may not be received for both CP SC 212 and 340. *Preq:* CP SC 102 or 210.

CP SC 350 Foundations of Computer Science 3(3,0) Development of the theoretical foundations of programming, algorithms, languages, automata, computability, complexity, data structures, and operating systems; a broad range of fundamental topics is consolidated and extended in preparation for further study. *Preq:* CP SC 212 and MTHSC 119 with a C or better.

CP SC 360 Distributed and Network Programming 3(3,0) Introduction to basic concepts in distributed systems. Network programming methods are considered. Data communications such as protocols, basic hardware components, performance and limitations are reviewed. *Preq:* CP SC 212 and 215 with a C or better.

CP SC 361 Data Management Systems Laboratory 1(0,2) Introduction to mainframe environments typical of large-scale data processing applications; programming languages, control languages, and file utilities; use of COBOL language and IBM JCL. *Preq:* CP SC 102 or 210, or equivalent. *Coreq:* CP SC 360.

CP SC 371 Systems Analysis 3(3,0) Incorporates a study of the decision-making process at all levels with the logical design of information systems. Extensive study of the system life cycle with emphasis on current as well as classical techniques for describing data flows, data structures, file design, etc. *Preq:* CP SC 360.

CP SC 372 Introduction to Software Development 3(3,0) Techniques and issues in software design and development; tools, methodologies, and environments for effective design, development, and testing of software; organizing and managing the development of software projects. *Preq:* CP SC 212 and 215 with a C or better.

CP SC H395 Honors Seminar 1(1,0) Research topics in various areas of computer science are presented. Methods for identifying and initiating research projects in various areas of computer science are considered. May be repeated for a maximum of two credits. *Preq:* Admission to Departmental Honors Program.

CP SC 405, 605 Introduction to Graphical Systems Design 3(3,0) Principles, computational techniques, and design concepts needed for designing systems for effective graphical displays. *Preq:* CP SC 212, 215, MTHSC 108, 311 with a C or better.

CP SC 411, 611 Virtual Reality Systems 3(3,0) Design and implementation of software systems necessary to create virtual environments. Techniques for achieving real-time, dynamic display of photorealistic, synthetic images are discussed. Includes hands-on experience with electromagnetically tracked, head-mounted displays and requires, as a final project, the design and construction of a virtual environment. *Preq:* CP SC 405 with a C or better.

CP SC 412, 612 Eye Tracking Methodology and Applications 3(3,0) Introduction to the human visual system; visual perception; eye movements; eye tracking systems and applications in psychology, industrial engineering, marketing, and computer science; hands-on experience with real time, corneal-reflection eye trackers, experimental issues. Final project requires the execution and analysis of an eye tracking experiment. *Preq:* CP SC 360, MKT 431, or PSYCH 310.

CP SC 414, 614 Human and Computer Interaction 3(3,0) Survey of human and computer interaction, its literature, history, and techniques. Covers cognitive and social models and limitations, hardware, and software interface components, design methods, support for design, and evaluation methods. *Preq:* CP SC 212 and 215 with a C or better, or equivalent.

CP SC 422, 622 Introduction to Operating Systems 3(3,0) Detailed study of the management techniques for the control of computer hardware resources. Topics include interrupt systems, primitive level characteristics of hardware and the management of memory, processor, devices, and data. Credit may not be received for both CP SC 332 and 422. *Preq:* CP SC 231, 360 with a C or better.

CP SC 424, 634 System Administration and Security 3(3,0) Topics related to the administration and security of computer systems are covered. Primary emphasis is placed on the administration and security of contemporary operating systems. *Preq:* CP SC 360 and 332 or 422 with a C or better.

CP SC 428, 628 Design and Implementation of Programming Languages 3(3,0) Overview of programming language structures and features and their implementation. Control and data structures found in various languages are studied. Runtime organization and environment and implementation models are also included. *Preq:* CP SC 231 and 360 with a C or better.

CP SC 429, H429, 629 Translation of Programming Languages 3(3,0) Techniques and considerations for compiling and interpreting programming languages. Topics include scanning, parsing, optimization, code generation, and their theoretical foundations. Implementation of a compiler or a major component of a compiler normally is a term project. *Preq:* CP SC 350, 428.

CP SC 455, 655 Computational Science 3(3,0) Introduction to the methods and problems of computational science. Course uses problems from engineering and science to develop mathematical and computational solutions. Case studies use techniques from Grand Challenge problems. Emphasizes the use of networking, group development, and modern programming environments. *Preq:* MTHSC 108, 311 and previous programming experience in a higher level language.

CP SC 462, H462, 662 Database Management Systems 3(3,0) Introduction to database/data communications concepts as related to the design of online information systems. Problems involving structuring, creating, maintaining, and accessing multiple-user databases are presented and solutions developed. Comparison of several commercially available teleprocessing monitor and database management systems is made. *Preq:* CP SC 360.

CP SC 463, 663 Online Systems 3(3,0) In-depth study of the design and implementation of transaction processing systems and an introduction to basic communications concepts. A survey of commercially available software and a project using one of the systems are included. *Preq:* CP SC 462.

CP SC 464, 664 Introduction to Computer Architecture 3(3,0) Survey of von Neumann computer architecture at the instruction-set level. Fundamental design issues are emphasized, illustrated using historical and current mainframe, supermini, and micro architecture. *Preq:* CP SC 330 or consent of instructor.

CP SC 472, H472, 672 Software Development Methodology 3(3,0) Advanced topics in software development methodology. Techniques such as chief programmer teams, structured design and structured walk-throughs are discussed and used in a major project. Emphasis is on the application of these techniques to large-scale software implementation projects. Additional topics such as mathematical foundations of structured programming and verification techniques are also included. *Preq:* CP SC 360 and 372.

CP SC 481, H481, 681 Selected Topics 1-3(1-3,0) Areas of computer science in which non-standard problems arise. Innovative approaches to problem solutions which draw from a variety of support courses are developed and implemented. Emphasis is on independent study and projects. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

CP SC 491 Seminar in Professional Issues II 1(1,0) Considers the impact of computing system development on society. Discusses ethical issues in the design and development of computer software. Standards for professional behavior, the professional's responsibility to the profession, and techniques for maintaining currency in a dynamic field are discussed by students. *Preq:* Senior standing.

CP SC H495 Senior Thesis Research 1-3(1-3,0) Directed individual research project for honors students supervised by departmental faculty. May be repeated for a maximum of six credits. *Preq:* Senior standing.

CONSTRUCTION SCIENCE AND MANAGEMENT

Professors: F. M. Eubanks, R. W. Liska, *Chair, Associate Professors:* G. R. Corley, C. A. Piper, R. K. Schneider, *Assistant Professors:* D. C. Bausman, S. N. Clarke

C S M 100 Introduction to Construction Science and Management 3(3,0) Introduction to the construction industry and the Construction Science and Management Department. *Preq:* Construction Science and Management major or consent of department chair.

C S M 201 Structures I 3(3,0) Study of statically determinate structural components and systems including force applications and distributions in structural elements and the resulting stress-strain patterns in axial, shear, and bearing mechanisms. *Preq:* MTHSC 102 or 106, PHYS 207; Construction Science and Management or Architecture major, or consent of department chair.

C S M 202 Structures II 3(3,0) Study of force distribution and behavior in statically determinate wood and steel structural components and systems including shear and moment stress, combined loading/stress conditions and deflections. *Preq:* C S M 201, Construction Science and Management or Architecture major, or consent of department chair.

C S M 203 Materials and Methods of Construction I 3(3,0) Descriptive study of the materials and methods of construction, focusing on nomenclature, building materials, and assembly of building systems consisting primarily of wood, masonry, residential interior and exterior finishes, and building foundations. *Preq:* Construction Science and Management or Architecture major, or consent of department chair. *Preq or Coreq:* A A H 210, ARCH 210, C S M 100 (Construction Science and Management majors).

C S M 204 Contract Documents 3(2,3) Introduction to working drawings, specifications, and the various documents required to carry out a typical construction project. *Preq:* Construction Science and Management major or consent of department chair. *Coreq:* C S M 205.

C S M 205 Materials and Methods of Construction II 3(3,0) Descriptive study of materials and methods of construction, focusing on nomenclature, building materials, and assembly of building systems consisting primarily of steel and concrete in addition to roofing assemblies and interior and exterior commercial finishes. *Preq:* C S M 203, Construction Science and Management or Architecture major, or consent of department chair.

C S M 301 Structures III 3(3,0) Analysis and design of basic determinate and indeterminate masonry and reinforced concrete structural components and systems; introduction to special structural systems and seismic loading. *Preq:* C S M 202, PHYS 208, Construction Science and Management or Architecture major, or consent of department chair.

C S M 303 Soils and Foundations 3(2,3) Study of various types of soils and foundations, including soil testing, reports, compaction, stability and function as they relate to the construction process. *Preq:* C S M 202, Construction Science and Management major, or consent of department chair.

C S M 304 Environmental Systems I 3(3,0) Theory and practice of heating, ventilating, air conditioning, and plumbing systems for buildings. *Preq:* C S M 205, PHYS 208, Construction Science and Management or Architecture major, or consent of department chair.

C S M 305 Environmental Systems II 3(3,0) Theory and practice of fire protection, specialty piping, lighting, and electrical systems for buildings. *Preq:* C S M 304, Construction Science and Management or Architecture major, or consent of department chair.

C S M 351 Construction Estimating 3(2,3) Basic estimating as applied to construction projects. Includes the take-off of material quantities, assigning labor and equipment production rates, and applying material prices, wage rates, and equipment costs to derive a total job cost. *Preq:* C S M 204, 205, CP SC 120, all required MTHSC courses, Construction Science and Management major, or consent of department chair. *Preq or Coreq:* B E 221, C S M 303.

C S M 352 Construction Scheduling 3(2,2) Analysis of construction projects with emphasis on estimating, scheduling, and resource leveling. *Preq:* C S M 304 (or concurrent enrollment), 351, Construction Science and Management major, or consent of department chair. *Coreq:* C S M 353.

C S M 353 Construction Estimating II 3(2,2) Continuation of basic construction estimating with the additional component of computerized estimating. Includes material, labor and equipment costs, production rates, bid ethics, constructability analysis, and understanding of other types of estimating procedures. *Preq:* C S M 301, 304 (or concurrent enrollment), 351, Construction Science and Management major, or consent of department chair. *Coreq:* C S M 352.

C S M 411 Safety in Building Construction 3(3,0) Study of construction safety management and controls. *Preq:* Construction Science and Management major or consent of department chair. *Coreq:* C S M 453.

C S M 420 Highway Construction and Contracting 3(3,0) Study of contracting and construction of highways, including selection and use of equipment, construction of pavements, bridges, and drainage structures, and related processes. *Preq:* C S M 303, 352, 353.

C S M 453 Construction Project Management 3(2,2) Study of construction business organization, methods of project delivery, field organization, policy, ethics, project management, control systems, labor management relations, and productivity. *Preq:* C S M 352, 353, LAW 322 (or concurrent enrollment), MGT 307 (or concurrent enrollment), Construction Science and Management major, or consent of department chair. *Coreq:* C S M 411, 461.

C S M 454 Construction Capstone 6(3,12) Students develop a capstone project that entails the knowledge obtained in all previous courses in the Construction Science and Management Program. Consists of a case study of an actual construction project covering technical, managerial, and professional skills and knowledge needed in the management of a construction project. *Preq:* C S M 453, Construction Science and Management major, or consent of department chair.

C S M 455, 655 Reducing Adversarial Relations in Construction 3(3,0) Focuses on the study of the delivery of projects and how adversarial relations can affect the successful completion of the venture. Topics include management of human resources, understanding the needs and processes of the participants, where problems lie, methods of avoiding and settling disputes. *Preq:* Construction Science and Management or Architecture major, senior standing, or consent of department chair.

C S M 461 Construction Economics Seminar 3(3,0) Studies in the financial performance of construction companies. *Preq:* ACCT 201, ECON 211, 212, Construction Science and Management major, or consent of department chair. *Coreq:* C S M 453.

C S M 490, H490 Directed Studies 1-3(1-3,0) Comprehensive studies and research of special topics not covered in other courses. Emphasis is placed on field studies, research activities, and current development in construction science. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

C S M 491 Construction Science and Management Internship and Examination 0 Eight hundred hours of verifiable construction-related experience. Verification of having taken the Certified Professional Constructor Examination.

C S M 498 Current Topics in Construction 1-3(1-3,0) Study of current topics in the construction industry not central to other construction science courses. Specific titles and course descriptions to be announced from semester to semester. May be repeated for a maximum of six credits. *Preq:* Consent of advisor.

CROP AND SOIL ENVIRONMENTAL SCIENCE

Professors: H. T. Knap, V. L. Quisenberry, E. R. Shippe, B. R. Smith, Associate Professors: W. C. Stringer, N. H. Walker, Assistant Professor: J. K. Norsworthy; *Lecturer:* B. E. Edge

CSENV 100 Introduction to Crop and Soil Environmental Science 1(1,0) Introduction to and survey of the agronomic and soil sciences and their application to current societal issues: career guidance, opportunities for professional certification, and discussion of skills used by agronomists and soil scientists.

CSENV 202 Soils 4(3,2) Introduction to world land resources, soil formation, classification, and mineralogy. Emphasis is on the basic chemical and physical properties of soil. Soil microorganisms, plant nutrients, and fertilization are discussed. Soil properties are related to growth. *Preq:* CH 101, 102 or a geology sequence including GEOL 101, or consent of instructor.

CSENV 350 Practicum 1-3 Preplanned internship undertaken with an approved agency concerned with agronomic practices. Restricted to minors in Crop and Soil Environmental Science. Maximum of three credits allowed. *Preq:* Consent of department chair.

CSENV 403, 603 Soil Genesis and Classification 2(1,3) Study of soil morphology and characterization, pedogenic processes, soil-forming factors, and classification of soils. *Preq:* CSENV 202 or consent of instructor.

CSENV 404, 604 Soils and Land Use 2(1,3) Soils interpretations for nonagricultural purposes and facilities. Emphasis is on use of modern soil surveys and properties and features of soils important in nonfarm land uses. Not open to Crop and Soil Environmental Science minors or to students who have taken CSENV 202.

CSENV 405, 605 Plant Breeding 3(2,2) Application of genetic principles to the development of improved crop plants. Principal topics include the genetic and cytogenetic basis of plant breeding, mode of reproduction, techniques in selfing and crossing, methods of breeding, inheritance in the major crops, and biometrical methods. *Preq:* GEN 302 or equivalent.

CSENV 406 Special Problems 1-3(0,3-9) Acquaints students with the scientific method. Literature investigation, planning, and execution of an experiment are integral parts of the course. Not open to AGRIC 11491 and 11492 students. Maximum of six credits allowed. *Prq:* Senior standing as a minor in Crop and Soil Environmental Science and consent of department chair.

CSENV 407, H407, 607 Introductory Weed Science 3(2,2)F Weed management in crops and pastures of the Southeast. Topics include weed identification, herbicide families and modes of action, herbicide formulations, herbicide diagnosis on crops and weeds, sprayer calibration and spray application, and nonchemical weed control strategies. *Prq:* AGRIC 104 or consent of instructor.

CSENV (BE) 408, 608 Land Treatment of Wastewater and Sludges 3(3,0)S Principles for designing environmentally acceptable land application systems using municipal and industrial wastewater and sludges are presented. Topics include land-limiting constituent analysis; soil-plant interactions; system equipment and design; system operation and management; public acceptance, social, and regulatory issues. Case studies and field trip(s) are planned. *Prq:* Senior standing in Agriculture or Engineering or consent of instructor.

CSENV 417, H417 Weed Morphology and Ecology 3(2,2) Study of the morphological characteristics of weed plants of economic importance in row crops, pastures, and turf of South Carolina. Succession, reproduction, dissemination, distribution, competition, and allelopathy are discussed. *Prq:* CSENV 407 or 433 or consent of instructor.

CSENV 421, 621 Principles of Field Crop Production 3(3,0)F Principles for production of field crops. Topics include botany and physiology, tillage, harvesting, storage, and crop quality. Principles are illustrated using examples from various crops. *Prq:* AGRIC 104 or equivalent introductory plant science, CSENV 202.

CSENV 422, 622 Major World Crops 3(3,0)S Examines the distribution, adaptation, production, and utilization of major agronomic crops of the world. Emphasizes crops important to U.S. agriculture. Specific crops discussed in more detail include corn, wheat, rice, sorghum, soybean, cotton, tobacco, and peanuts. *Prq:* AGRIC 104 or equivalent introductory plant science, CSENV 202.

CSENV 423, H423, 623 Field Crop—Forages 3(3,0)S Establishment, management, and utilization of forage crops in a forage-livestock agroecosystem context. Hay, silage, and pasture utilization are discussed. Computer model used to study complexity of forage-livestock production systems. *Prq:* AGRIC 104, CSENV 202, or consent of instructor.

CSENV 424, 624 Applied Aspects of Forage Management 1(0,2) Hands-on exposure to forage plantings, establishment and management practices. Pasture and harvested forage systems, equipment and practices; analysis of forage-livestock systems. *Prq:* CSENV 423 (or concurrent enrollment).

CSENV 425, 625 Seed Science and Technology 3(2,2)S Even-numbered years. Topics include seed development, germination, dormancy, pathology, storage, and deterioration. Seed testing and commercial production of seed are also covered. Emphasis is on useful applications of current seed science knowledge. *Prq:* AGRIC 104, BIOSC 205.

CSENV (AP EC) 426, 626 Cropping Systems Analysis 3(2,2)F Application of agronomic and economic principles in solving problems relating to production and marketing of agronomic crops. Major part of the course is a case study in which detailed analysis of a farm, agribusiness or environmental situation is made with students making formal written and oral presentations of results. *Prq:* AP EC 202, AGRIC 104, Junior standing.

CSENV (HORT) 433, 633 Integrated Weed Management for Agronomic and Horticultural Crops 3(2,2)S See HORT 433.

CSENV 446, 646 Soil Management 3(3,0)F Basic soil properties are related to compaction, water and solute movement, and root growth. Practical management problems are considered and solutions developed based on basic soil characteristics. Problems include erosion, no-tillage, compaction, irrigation, leaching, waste application, golf-green management, and orchard establishment. *Prq:* CSENV 202.

CSENV 452, 652 Soil Fertility and Management 3(3,0)S Soil properties, climatic factors, and management systems in relation to soil fertility maintenance for crop production; plant nutrition and growth in relation to crop fertilization and management. *Prq:* CSENV 202 or consent of instructor.

CSENV 453, H453, 653 Soil Fertility Laboratory 1(0,3)S Evaluation and interpretation of soil fertility production. *Prq:* CSENV 202 or consent of instructor.

CSENV 455 Seminar 1(1,0)F Student presentation of current agronomic topics of special interest in crop production appearing in recent scientific journals and other publications.

CSENV 475, H475, 675 Soil Physics and Chemistry 3(2,3)S Study of the principles of soil physics and chemistry and their applications. Topics include soil texture, structure, compaction, water relations, solute movement, mineral composition, adsorption phenomenon, and soil acidity. *Prq:* CSENV 202, CH 101, PHYS 207.

CSENV 490, 690 Beneficial Soil Organisms in Plant Growth 3(3,0)S Aspects of biological nitrogen fixation, mycorrhizal fungi, microbial-pesticide interactions, bioremediation, nutrient cycles, and biological pest control related to plant growth, soil/environmental quality; and sustainable agriculture are covered. Students who desire laboratory experience in these topics may register for CSENV 406 after consultation with instructor. *Prq:* CSENV 202, MICRO 305, PL PA 401, or consent of instructor.

DANCE

Lecturer: C. Hosler

DANCE 130 Tap Dance 1 (0,3) Introduction to the fundamentals and vocabulary of tap dancing with opportunities to develop rhythmic patterns of various origins. May be repeated for a maxi-

mum of eight credits, with a maximum of 16 credits of dance applied toward a degree. Applied dance fee will be assessed.

DANCE 140 Jazz Dance 1 1(0,3) Introduction to the basic principles and fundamentals of jazz technique, as well as exploration of flexibility and strength-building exercises. May be repeated for a maximum of eight credits, with a maximum of 16 credits of dance applied toward a degree. Applied dance fee will be assessed.

DANCE 150 Modern Dance 1 1(0,3) Introduction to the basic principles of dance movement and vocabulary, as well as actively exploring and applying different methods of body alignment and theory. May be repeated for a maximum of eight credits, with a maximum of 16 credits of dance applied toward a degree. Applied dance fee will be assessed.

DANCE 160 Ballet Dance 1 1(0,3) Introduction to the basic principles and fundamentals of classical ballet, with emphasis on good technique, center work, and across the floor work. May be repeated for a maximum of eight credits, with a maximum of 16 credits of dance applied toward a degree. Applied dance fee will be assessed.

DESIGN STUDIES

Professors: J. R. Caban, *Chair*; L. G. Craig, R. J. Hogan, Y. Kishimoto, R. B. Norman; *Associate Professors:* H. C. Harriott, N. J. Hurt; *Assistant Professors:* R. L. Rael, R. T. Silance, M. L. Skinner; *Lecturers:* R. A. Bruhn, G. V. Epolito, A. H. Jacques, C. B. Mills, V. M. San Fratello

DSIGN 321 Wood Shop Practices, Materials, Tools, and Equipment 3(1,6) Instruction in the use of a full range of shop machinery, tools, equipment, and craftsmanship as well as an orientation to a wide variety of materials, techniques, and procedures. The paramount importance of safety is continually emphasized. *Prq:* Consent of instructor.

EARLY CHILDHOOD EDUCATION

ED EC 220 Family, School, and Community Relationships 3(3,0) Historical trends, theoretical models, and strategies of effective family/school/community relationships are examined. Special emphasis is placed on multicultural issues and on programs that support collaborative interaction with families that benefit children. *Prq:* Sophomore standing.

ED EC 300 Foundations of Early Childhood Education 3(3,0) Philosophical and historical foundations of Early Childhood Education, societal changes and influences, needs of young children and families, program differentiation, and future trends are examined through coursework and experiential activities. *Prq:* General Education requirements; ED EC 220, ED F 334, or consent of instructor.

ED EC 336, H336 Social Development of Infants and Young Children 3(3,0) Study of the behavior of the preschool child from infancy through age five. Theoretical concepts and observation of children's behavior are integrated, analyzed, and evaluated to discover implications for teaching and guiding preschool children. Includes a minimum of 10 one-hour observation-participation visits in public kindergarten. *Preq:* ED F 334, minimum grade-point ratio of 2.0 or consent of instructor.

ED EC 400 Observation and Assessment in Clinical Settings 3(3,0) Clinical experiences in early childhood settings prior to student teaching provide opportunities for observing, guiding, and assessing young children, birth to age eight, in a variety of high quality preschool and primary settings. Practicum spans the entire semester. To be taken Pass/Fail only. *Preq:* ED EC 336; concurrent enrollment in ED EC 420, 430, 440, 450, and READ 459.

ED EC 420 Early Childhood Science 3(3,0) Students develop knowledge, skills, and attitudes needed to foster science education among young children. Emphasis is on teaching strategies and techniques appropriate for young children (birth to age eight), understanding the unique learning needs of special populations, and integrating science across the curriculum. *Preq:* General Education requirements. *Coreq:* ED EC 400, 430, 450, READ 459.

ED EC 430 Early Childhood Mathematics 3(3,0) Theories and methods of teaching mathematics are examined in terms of how young children develop mathematical thinking. Topics include problem solving, current issues, diversity, current technologies, reflective teaching, and applications of math in everyday life. *Preq:* General Education mathematical sciences requirement; admission to the professional level. *Coreq:* ED EC 400, 420, READ 459.

ED EC 440 Integrated Language Arts and Social Studies in Primary Schools 3(3,0) Integrates social studies and language arts in a course that reflects recommended teaching practices for young children (birth to age eight). Uses language arts as an approach for teaching social studies content, techniques, and methods in primary schools. *Preq:* Admission to the professional level. *Coreq:* ED EC 400, 420, 430, READ 459.

ED EC 450 Early Childhood Curriculum 3(3,0) Constructivist approach is used to explore children's thinking as it influences curriculum design in early childhood; analyze the educational needs of the young child in the cognitive realm; and examine the implementation of activities, experiences, and play-based program models. *Preq:* Admission to the professional level. *Coreq:* ED EC 400, 420, READ 459.

ED EC 484 Directed Teaching in Early Childhood Education 12(1,33) Supervised observation and teaching experiences in cooperation with nursery schools, kindergartens, and early elementary schools. Restricted to seniors or graduates who have completed prerequisite courses and have the cumulative grade-point ratio for graduation. *Preq:* ED EC 400, 450, ED EL 321, 488, READ 459; admission to the professional level, consent of area committee chair.

EAST ASIAN STUDIES

E A S 123 Introduction to China 3(3,0) Introduction to various aspects of Chinese civilization, including geography, ethnic groups, language, history, philosophy, religion, literature, arts, architecture, and social customs. All readings and discussions are in English.

ECONOMICS

Professors: D. K. Benjamin, D. W. Blair, W. R. Dougan, Chair; R. D. Elliott, C. M. Lindsay, R. D. McCormick, M. T. Maloney, D. L. Placone, R. D. Sauer, Jr., G. R. Thompson, R. D. Tollison, J. T. Warner; *Associate Professors:* D. B. Gordon, C. J. Simon, R. F. Tamura; *Assistant Professors:* S. L. Baier, B. G. Coffey, A. K. Dills, J. K. Hakes, M. M. Jerzmanowski, T. D. Kendall, S. Orrefice, L. Zhang

ECON 200 Economic Concepts 3(3,0) One semester survey of basic economic concepts that offers an overview of both microeconomics and macroeconomics. Not intended for business majors or other students seeking a comprehensive introduction to economic analysis and its applications. Credit will not be given to students who previously have completed ECON 211 or 212.

ECON 211, H211 Principles of Microeconomics 3(3,0) Introduction to economic reasoning and its application to the study of the behavior of consumers and business firms. Particular topics include competition, monopoly, international trade, and the impact of selected public policies. Intended as the first of a two-semester sequence in the foundations of economics.

ECON 212, H212 Principles of Macroeconomics 3(3,0) Continuation of ECON 211 in which fundamental economic principles are applied to the study of aggregate economic performance. Topics include the forces determining the rates of inflation, unemployment, and economic growth, with particular emphasis on the influence of fiscal and monetary policies through financial markets. *Preq:* ECON 211 or consent of instructor.

ECON 301 Economics of Labor 3(3,0) Introduces students to the economics of the labor market and labor relations. Considers the theories of wages and employment, determination, unemployment, investment in human capital, discrimination, and public policy toward the labor market. Also considers the role of labor unions. May not be used to satisfy requirements for a degree in Economics. *Preq:* ECON 211 or consent of instructor.

ECON 302 Money and Banking 3(3,0) Considers the function of money and banking in both the product and financial markets. Special emphasis is placed on monetary theory and current problems of monetary policy. May not be used to satisfy requirements for a degree in Economics. *Preq:* ECON 212 or consent of instructor.

ECON (MGT) 306 Managerial Economics 3(3,0) Uses tools of economic analysis in classifying problems in organizing and evaluating information, and in comparing alternative courses of action. Bridges the gap between economic theory and managerial practices. May not be used to satisfy requirements for a degree in Economics. *Preq:* ECON 211 or consent of instructor.

ECON 307 Arbitration 3(3,0) Analysis of dispute settlement procedures with specific emphasis on mediation, fact-finding, and arbitration as they are used to resolve labor-management disputes in the public and private sectors. *Preq:* Consent of instructor.

ECON 308 Collective Bargaining 3(3,0) Practices, procedures, legal foundations, and legal structure associated with collective bargaining. Form and content of the labor contract, grievance machinery, and mediation and arbitration institutions are also studied. *Preq:* ECON 211 or consent of instructor.

ECON 309 Government and Business 3(3,0) Relationships between government and business, including, among other topics, government efforts to enforce competition; to regulate public utilities; and to protect the special interest of laborers, farmers, and consumers. May not be used to satisfy requirements for a degree in Economics. *Preq:* ECON 211 or consent of instructor.

ECON 310 International Economy 3(3,0) Studies of the process of international commerce. Covers basic theory of trade and exchange rates, institutional and legal environment, current policy issues. Not open to students who have taken ECON 412. May not be used to satisfy requirements for a degree in Economics. *Preq:* ECON 211 and 212 or consent of instructor.

ECON 314, H314 Intermediate Microeconomics 3(3,0) Analytical study of the basic concepts of value and distribution under alternative market conditions. *Preq:* ECON 211 or consent of instructor.

ECON 315, H315 Intermediate Macroeconomics 3(3,0) Macroeconomic problems of inflation and unemployment are the focal points. Statistics (measures of real output and the price level) and theory (covering the sources of short-run fluctuations and long-run growth) are included. Appropriate public policies addressing these issues are analyzed. *Preq:* ECON 212 or consent of instructor.

ECON 319 Environmental Economics 3(3,0) Study of the application of economic logic to issues surrounding environmental management and policy. Examines individual, firm, and collective decision making as well as the evolution of regulatory approaches for controlling environmental use. *Preq:* ECON 314.

ECON (E L E) 321 Economics of Innovation 3(3,0) Examines the nature of entrepreneurship and the contribution of innovation to economic growth. The organizational and institutional sources of innovation in different firms and different countries are investigated as well as the work of economic theorists concerning the role entrepreneurs play in bringing new products to market. *Preq:* ECON 306 or 314.

ECON 324 Economics and Sports 3(3,0) Economic analysis of sports teams, leagues, and institutions. Analysis of basic economic issues using sports data. May not be used to satisfy requirements for a degree in Economics. Credit will not be given to students who have completed ECON 426. *Preq:* Sophomore standing, ECON 211.

ECON 325 Personnel Economics 3(3,0) Studies the various compensation and personnel practices that firms employ. Explains when each of those practices should be followed to elicit the desired employee effort and labor force quality. Topics include piece-rate and time-rate systems, seniority-based incentive schemes, promotion contests, evaluation systems, mandatory retirement, and up-or-out rules. *Preq:* ECON 211 or consent of instructor.

ECON 340 Behavioral Economics 3(3,0) Introduction into the economic, sociological, and psychological aspects of decision making under uncertainty. Presents the psychology of prediction, intuitive prediction; biases and corrective procedures. Topics also include framing, choice with costly information, and social influences on individual behavior. *Preq:* ECON 211 or consent of instructor.

ECON 350, H350 Moral and Ethical Aspects of a Market Economy 3(3,0) Can a market system produce results that are fundamentally just? Is justice possible without voluntary exchange? Course applies both economic and philosophical analyses to these questions. Emphasis is placed on the causes, consequences, and morality of the distribution of wealth and income in a free-market system. *Preq:* ECON 314 or consent of instructor.

ECON 360 Public Choice 3(3,0) Covers the economic approach to political activities and institutions. Topics include voting, voting rules, constitutions, political competition, political business cycles, vote trading, interest groups, bureaucracy, committees, legislators, executives, and judges. Designed for Economics and non-Economics majors and requires only basic skills in microeconomics. *Preq:* ECON 211 or consent of instructor.

ECON H390 Junior Honors Research 1(1,0) Readings and research in conjunction with an approved economics course at the 300 or 400 level. Honors status required. May be taken three times.

ECON 401 Labor Market Analysis 3(3,0) Develops the methods of economic analysis of labor markets. Requires students to apply these methods to problems of the labor market. Topics include labor demand and supply, human capital, occupational choice, compensating wage differentials, organizational wage structures and incentive systems, unemployment, and discrimination. *Preq:* ECON 314.

ECON 402 Law and Economics 3(3,0) Application of economics to the law of property, torts, and contracts; regulation of markets, business organizations, and financial transactions; distribution of income and wealth; and criminal law. *Preq:* ECON 211 or consent of instructor.

ECON 404 Comparative Economic Systems 3(3,0) Comparative analytical and historical study of the principal economic systems which have been important in the modern world including, among others, capitalism and socialism. *Preq:* ECON 314 or consent of instructor.

ECON 405, 605 Introduction to Econometrics 4(3,3) Introduction to methods of quantitative analysis of economic data. Reviews basic statistical methods and probability distribution. Topics include data management using professional statistical software applications; multiple regression analysis; hypothesis testing under conditions of

multicollinearity, heteroscedasticity, and serial correlation. *Preq:* ECON 211 and 212; MTHSC 108 or 207; EX ST 301 or MTHSC 301 or 309.

ECON 406, 606 Advanced Econometrics 3(3,0) Reviews statistical inference using multiple regression (OLS) analysis and model specification. Topics include multicollinearity, heteroscedasticity, and serial correlation; two-stage least squares and instrumental variables models; simultaneous equations models; limited dependent variable models using maximum likelihood estimation and time-series analysis; and presentation of results in technical writing. *Preq:* ECON 405 or consent of instructor.

ECON 410, 610 Economic Development 3(3,0) Consideration and analysis of economic and related problems of underdeveloped countries. Attention is given to national and international programs designed to accelerate solution of these problems. *Preq:* ECON 314 or consent of instructor.

ECON 411, 611 Economics of Education 3(3,0) Analysis of economic issues related to education. The decision to invest in education, elementary and secondary school markets and reform, the market for college education, teacher labor markets, and education's effects on economic growth and income distribution. *Preq:* ECON 314 or consent of instructor.

ECON 412 International Microeconomics 3(3,0) Analysis of the essential aspects of international economic linkages. Gains and redistributive effects of trade and the barriers to trade are discussed within the context of a variety of economic models. The history of trade policy and the political economy of its determination are also discussed. *Preq:* ECON 314 or consent of instructor.

ECON 413 International Macroeconomics 3(3,0) Examination of macroeconomic linkages between an individual country and the rest of the world and how these linkages are affected by the choice of exchange rate regimes. Topics include the relation between domestic and foreign interest rates and exchange rates and the ability to pursue independent monetary policies. *Preq:* ECON 315.

ECON 419 Economics of Defense 3(3,0) Examines the American defense establishment in terms of resources utilized, alternative uses, and the contribution to the national economy and scientific progress generated by resources in a defense use. Discusses economic problems inherent in shifting resources between defense and nondefense uses and among alternative defense uses. *Preq:* ECON 314.

ECON 420 Public Sector Economics 3(3,0) Study of the role of government and its proper functions and limitations in a market. Provision of goods and services by all levels of government and instruments of taxation are evaluated according to efficiency and equity criteria. Contemporary public sector issues are emphasized throughout. *Preq:* ECON 314 or consent of instructor.

ECON 422 Monetary Economics 3(3,0) Intensive study of the role of monetary factors in economic change. Modern monetary theories and their empirical relevance for policy are developed against a background of monetary history and institutions. *Preq:* ECON 314 and 315 or consent of instructor.

ECON 424 Organization of Industries 3(3,0) [W,2] Empirical, historical, and theoretical analyses of market structure and concentration in American industry: the effects of oligopoly, monopoly, and cartelization upon price, output, and other policies of the firm, antitrust and other public policies and problems are studied. *Preq:* ECON 314 or consent of instructor.

ECON 425, 625 Antitrust Economics 3(3,0) Analysis of the economic and legal issues created by the exercise of market power. The motivation and execution of government policy towards mergers, predatory conduct, and various restraints of trade are intensively examined. *Preq:* ECON 309 or 314 or consent of instructor.

ECON 426, H426, 626 Seminar in Sports Economics 3(3,0) Economic analysis of sports teams, leagues, and institutions. Topics include antitrust issues, public funding of sports venues, labor relations, wagering markets, athlete compensation, and application of economic principles to sports settings. Empirical research project is cornerstone of course. *Preq:* ECON 314, 405; or consent of instructor.

ECON 430 Topics in Mathematical Economics 3(3,0) Skills acquired in freshman mathematics are applied to selected topics in economic theory. Course is a good complement to ECON 314 and provides excellent preparation for 400-level courses in economics, especially ECON 405. May be taken concurrently with ECON 314. *Preq:* ECON 314, and MTHSC 108 or 207.

ECON 440, 640 Game Theory 3(3,0) Introduction to the formal analysis of strategic interaction among rational, self-interested rivals. Basic theoretical aspects of games are discussed and applied to such topics as bargaining, voting, auctions, and oligopoly. *Preq:* ECON 314 and MTHSC 106, or ECON 430, or consent of instructor.

ECON H491 Senior Honors Thesis Research 3(3,0) Reading and research for the Senior Honors Thesis. *Preq:* ECON 314, 315, senior honors standing.

ECON H492 Senior Honors Thesis Writing 3(3,0) Writing and oral presentation of the Senior Honors Thesis. *Preq:* ECON H491.

ECON 496 Independent Study 1-3(1-3,0) Research and writing on a selected economics topic chosen by the student. A written proposal must be approved by the instructor prior to the start of the semester. May be repeated for a maximum of six credits. *Preq:* ECON 314.

ECON 498, H498 Selected Topics in Economics 3(3,0) In-depth treatment of topics not covered fully in regularly scheduled courses. Specific topics vary from year to year. May be repeated for a maximum of nine credits, but only if different topics are covered. *Preq:* ECON 314 and 315 or consent of instructor.

ECON 499 Senior Seminar in Economics 1-3(1-3,0) Discussion of topics of current interest in economics. Students do directed research on a particular topic. *Preq:* Consent of instructor.

EDUCATION

Professors: B. E. Bailey, K. S. Headley, W. H. Leonard; *Associate Professors:* P. J. Dunston, C. C. Linnell, E. M. Owens, V. G. Ridgeway, D. J. Sluss, D. A. Smith, D. Stegell; *Assistant Professors:* R. M. Horton, R. A. Kuminiski, L. F. Mcford, S. J. Pass; *Lecturers:* G. N. Bowman, S. N. Burr, D. J. Cadorette, J. K. Weir, N. S. Wilkinson; *Visiting Instructor:* C. P. Whitaker

ED 105 Orientation to Education 1(1,0) Lectures and discussions on teaching. For a minimum of ten weeks, students spend one hour per week in schools assisting teachers, observing, and tutoring individuals. Required of all students in Early Childhood, Elementary, and Secondary Education, Mathematics Teaching, and Science Teaching. To be taken Pass/Fail only.

ED 110 Introduction to Tutoring 1(1,0) Students develop and reinforce skills in tutoring and communication through use of techniques based in educational research. To be taken Pass/Fail only.

ED 111 Introduction to Supplemental Instruction 1(1,0) Students develop and reinforce interpersonal relationship skills in listening, decision making, communicating, group dynamics, leadership, assertiveness, time management, problem solving, and conflict resolution. To be taken Pass/Fail only.

ED 322 Responding to Emergencies 3(3,0) Provides the citizen responder with the knowledge and skills necessary in a variety of emergencies to help sustain life and to minimize pain and the consequences of injury until professional help arrives. First aid, CPR, and automated external defibrillation (AED) are included.

ED 405 Multiculturalism 3(3,0) Introduces prospective teachers to the influence of culture on learning from an anthropological and historical perspective. *Preq:* HIST 172 or 173; or consent of the instructor.

ED 438 Selected Topics in Education 1-3(1-3,0) Specific education topics not found in other courses are selected for in-depth study. May be repeated for a maximum of six credits, but only if different topics are covered.

ED 439 Independent Study in Education 1-3(1-3,0) Study of selected topics in education under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study different from any existing courses and designed for the individual student. May be repeated for a maximum of six credits, but only if different topics are covered.

ED 441, 641 Middle School Curriculum 3(3,0) Concepts and methods for teaching middle school students. Discusses nature of middle school students, teacher characteristics, curricular and co-curricular programs, organization, and teaching.

ED H499 Education Honors Capstone 3(1,4) Students seeking departmental honors complete their honors research under faculty mentors. Seminar meetings occur across the semester and include the sharing and discussion of research results and experiences by students and faculty. *Preq:* ED F H301, H302, departmental honors course specified by major area.

EDUCATIONAL COUNSELING

ED C 234 Introduction to Addictions: Basic Education and Prevention 3(3,0) Basic review of addictions and chemical dependence; gives future educators skills in the identification of chemical abuse, techniques for intervention, and methods of prevention education. SOC 396 and 397 are recommended as follow-up courses for those interested in pursuing the topic.

ED C 390 Student Development, Leadership, and Counseling for University Paraprofessionals 3(3,0) Introduction to theoretical and practical applications of student development and leadership on the university campus. Skills assisting students with leadership development, problem solving, conflict resolution, confrontation, and referral are developed. Legal and ethical issues for practitioners and learning effective utilization of resources available on the campus are explored.

EDUCATIONAL FOUNDATIONS

Professors: D. E. Barrett, W. R. Fisk, *Chair*; R. P. Green, Jr.; *Associate Professors:* G. C. Delicio, C. L. Peters, D. M. Switzer, C. G. Weatherford; *Assistant Professor:* S. N. Rosenblith; *Lecturer:* J. S. Wright; *Visiting Instructors:* R. W. Buford, E. C. Crowther

ED F 301, H301 Principles of American Education 3(3,0) Study of the legal basis, historical development, characteristics, and functions of educational institutions in the United States. *Preq:* Minimum grade-point ratio of 2.0.

ED F 302, H302 Educational Psychology 3(3,0) Introduction to classroom use of objectives, motivation theories, learning theories, tests and measurements, classroom management, and knowledge of exceptional learners. *Preq:* Minimum grade-point ratio of 2.0.

ED F (THRD) 315 Integrating Computers into the Classroom 1(0,2) Students learn how to use microcomputers to supplement the classroom curriculum and to enhance classroom management. *Preq:* Admission to a Teacher Education Program; ED F 301, 302; General Education computer skills requirement; minimum grade-point ratio of 2.0; or consent of instructor.

ED F 334, H334 Child Growth and Development 3(3,0) Introduction to lifespan development. Heavy emphasis is placed on the physical, social, emotional, and cognitive characteristics. Includes a minimum of five one-hour observation-participation visits to an elementary school. *Preq:* ED 105 or concurrent enrollment, minimum grade-point ratio of 2.0, or consent of instructor for non-education majors.

ED F 335, H335 Adolescent Growth and Development 3(3,0) Introduction to lifespan development. Emphasis is on the physical, social, emotional, and cognitive characteristics of the 10- to 18-year old and the educational implications of those developmental characteristics.

ED F 406 Philosophy, Schooling, and Educational Policy 3(3,0) Analysis of the development of contemporary educational theory and its impact on current schooling practices and educational policy development.

ED F (AG ED, THRD) 480, 680 Educational Applications of Microcomputers 3(2,2) [C,3] Fundamentals of computer applications for teachers. Develops competencies in general computer applications such as word processing and database management and addresses educational uses of the Internet and computer-assisted instruction, with emphasis on legal and ethical issues and the impact of computer technology upon society. *Preq:* Admission to a Teacher Education Program.

ED F (AG ED, THRD) 482, 682 Advanced Educational Applications of Microcomputers 3(2,2) Provides students with the knowledge and skills needed to apply microcomputer technology to the utilization and generation of educational software in accordance with sound educational principles. *Preq:* ED F (AG ED, THRD) 480.

ED F 490, 690 Student Management and Discipline 3(3,0) Aids pre-service and in-service teacher development and refines knowledge, skills, and values important for managing students in school settings. Practical application of theory and research and legal and ethical considerations are emphasized. *Preq:* ED F 302 or PSYCH 201; ED F 334, 335, or suitable alternative; minimum grade-point ratio of 2.0.

ED F 497, 697 Instructional Media in the Classroom 3(3,0) Integrated approach to the use of audiovisual media stressing systematic planning, selection, utilization, and evaluation as well as production of materials and equipment operation. *Preq:* Minimum grade-point ratio of 2.0.

ELECTRICAL AND COMPUTER ENGINEERING

Professors: C. M. Butler, D. M. Dawson, T. L. Drake, A. A. Girgis, J. N. Gowdy, *Chair*; J. J. Komo, E. B. Makram, L. W. Pearson, K. F. Poole, M. B. Pursley, R. J. Schalkoff, R. Singh, I. D. Walker; *Associate Professors:* C. W. Baum, E. G. Baxa, Jr., M. A. Bridgwood, E. R. Collins, Jr., W. B. Ligon III, A. Q. Martin, D. L. Noneaker, X.-B. Xu; *Assistant Professors:* W. R. Harrell, A. W. Hoover, H. B. Russell, R. R. Sass, D. C. Stanzione, Jr., *Research Associate:* T. Taha; *Visiting Assistant Professors:* S. J. Hubbard, W. J. Reid III

E C E 201, H201 Logic and Computing Devices 3(2,2) Study of logic with an introduction to Boolean algebra; number systems and representation of information; use of integrated circuits to implement combinational and sequential logic functions and computing elements; organization and structure of computing systems. *Preq:* MTHSC 108, PHYS 122.

E C E 202, H202 Electric Circuits I 3(3,0) DC resistive circuits, Kirchhoff's Laws, Nodal and Mesh analysis, sources, Thevenin's and Norton's theorems, RC, RL, RCL circuit solutions with initial condition using homogeneous or nonhomogeneous ordinary differential equations having constant coefficients. Develop sinusoidal steady state solution. *Preq:* MTHSC 108, PHYS 122. *Coreq:* E C E 211, PHYS 221.

E C E 204 Circuit Analysis Problems I 1(0,3) Analysis and solution of electrical network problems using mesh and nodal analysis, Thevenin's and Norton's theorems and equivalent circuits and other circuit analysis from E C E 202. *Coreq:* E C E 202.

- E C E 211 Electrical Engineering Laboratory I 1(0,2)** Principles of measurement and instruments used to measure parameters and dynamic variables in electric circuits, steady state and transient measurements in DC and AC circuits, and data analysis methods are included. *Coreq:* E C E 202.
- E C E 212 Electrical Engineering Laboratory II 1(0,2)** Emphasizes measurement techniques in AC steady-state circuits and comparison to theoretical predictions. Two-port network methodology and transfer functions are studied experimentally and related to analysis using transform techniques. *Preq:* E C E 202, 211. *Coreq:* E C E 262.
- E C E 262, H262 Electric Circuits II 3(3,0)** Continuation of the study of electric circuits, including three-phase circuits, complex frequency and network functions, frequency response, two-port parameters, magnetically-coupled circuits, Laplace transforms, and introduction to Fourier series and transforms. *Preq:* E C E 202, MTHSC 206, PHYS 221. *Coreq:* E C E 212, MTHSC 208.
- E C E 263 Circuit Analysis Problems II 1(0,3)** Analysis of basic AC circuit analysis techniques to analyze the transient and steady-state behavior of both simple and complex circuits. *Coreq:* E C E 262, MTHSC 208.
- E C E 272 Computer Organization 4(3,2)** Introductory course in computer organization and architecture. Topics include basic hardware and software structure, addressing methods, programs control, processing units, I/O organization, arithmetic, main-memory organization, peripherals, microprocessor families, RISC architectures, and multiprocessors. *Preq:* E C E 201 and CP SC 101 or 111 or 157 or 210.
- E C E H300 Junior Honors Seminar 1(2,0)** Acquaints students enrolled in the Departmental Honors Program with current research activities in the Department. Faculty provide seminars where research interests are summarized. Seminars are planned to prepare students in choosing research topics for their senior theses.
- E C E 307 Basic Electrical Engineering 2(2,0)** A first course in electrical engineering to provide non-Electrical Engineering majors with a knowledge of DC and AC circuit theory, AC power distribution, and numerous electrical devices, apparatus, and digital systems. *Preq:* MTHSC 206, PHYS 221. *Coreq:* E C E 309.
- E C E 308 Electronics and Electromechanics 2(2,0)** Continuation of E C E 307. Energy conversion systems are considered, as well as basic electronics. *Preq:* E C E 307.
- E C E 309 Electrical Engineering Laboratory I 1(0,2)** Laboratory to accompany E C E 307. Basic electrical circuits and instrumentation. *Coreq:* E C E 307.
- E C E 311 Electrical Engineering Laboratory III 1(0,2) [W.1]** Measurements and characteristics of electronic devices and circuits; use of manual and automated instruments to acquire data; oral and written engineering reports. *Preq:* E C E 262, MTHSC 208, PHYS 221. *Coreq:* E C E 320.
- E C E 312 Electrical Engineering Laboratory IV 1(0,2) [W.1]** Design and characterization of functional circuits using solid-state devices; use of manual and automated instruments for measurements; statistical analysis of data; and preparation of engineering reports. *Preq:* E C E 311, 320. *Coreq:* E C E 321.
- E C E 317 Random Signal Analysis 3(3,0)** Introduction to engineering problems of a probabilistic nature. Systems transformations, statistical averages, simulation, and estimation of system parameters. *Preq:* E C E 262, MTHSC 208. *Coreq:* E C E 330.
- E C E 320 Electronics I 3(3,0) [O.1]** Introduction to electronic materials and devices; principles of design; design of DC and AC circuits using diodes, bipolar junction transistors, field-effect transistors and use of transistors in digital circuits. *Preq:* E C E 262, MTHSC 208, PHYS 221. *Coreq:* E C E 311.
- E C E 321 Electronics II 3(3,0)** Analysis and design of discrete amplifier circuits at low and high frequencies; operational amplifiers, distortion in amplifiers, oscillator design, and circuit analysis of active digital devices. *Preq:* E C E 320. *Coreq:* E C E 312.
- E C E 327 Digital Computer Design 3(3,0)** Design of high-speed ALUs, control and timing circuitry, memory systems and I/O circuitry; microprogrammed computer design using bit-slice microprocessors; current hardware topics related to computer design; hands-on design experience; and use of logic analyzer for system debugging. *Preq:* E C E 371.
- E C E 329 Computer Systems Structures 3(3,0)** Fundamental structures and issues that arise in the analysis and implementation of computer systems. Topics include operating systems structures and data structures and their relationship to computer organization. Engineering science background for computer systems design. *Preq:* CP SC 102 or 210; CP SC 340 or 212; E C E 272.
- E C E 330, H330 Signals, Systems, and Transforms 3(3,0)** Systems models, analysis of signals, Fourier series and transforms, sampling and Z transforms, discrete Fourier transforms. *Preq:* E C E 262, MTHSC 208.
- E C E 352 Programming Systems 3(3,0)** Second course in programming languages and systems. Topics include assemblers, compilers, and syntactical methods; string manipulation and list processing; concepts of executive programs and operating systems; introduction to time-sharing systems. *Preq:* CP SC 340 or 212 and MTHSC 419.
- E C E 360 Electric Power Engineering 3(3,0)** Presents the basic principles of electromagnetic induction and electromagnetic forces developed. Topics include synchronous machines, power transformers, electric power transmission, and distribution systems, DC motors, and induction motors. *Preq:* E C E 262, PHYS 221.
- E C E 371 Microcomputer Interfacing 4(1-3,1-3) [W.1]** Interfacing of microcomputers to peripherals or other computers for purposes of data acquisition, device monitoring and control, and other communications. The interfacing problem is considered at all levels including computer architecture, logic, timing, loading, protocols, and software laboratory for building and simulating designs. *Preq:* E C E 262, 272. *Coreq:* E C E 320.
- E C E 380 Electromagnetics 3(3,0)** Introduction to electric fields and potentials, dielectrics, capacitance, resistance, magnetic field, forces, work and energy, inductance, time-varying fields, and Maxwell's equations. *Preq:* E C E 262, PHYS 221, MTHSC 206.
- E C E 381 Fields, Waves, and Circuits 3(3,0)** Foundation of circuit theory, transmission lines and circuits, plane-wave propagation, fiber optics, radiation and antennas, coupled circuits. *Preq:* E C E 380, MTHSC 208.
- E C E 404, 604 Semiconductor Devices 3(3,0)** Consideration of the principles of operation, external characteristics, and applications of some of the more important semiconductor devices presently available. *Preq:* E C E 320. *Coreq:* MTHSC 311 or 434.
- E C E 405 Design Projects in Electrical and Computer Engineering 1-3(0,2-6)** Individually defined projects oriented toward providing experience in establishment of objectives and criteria, synthesis, analysis, construction, testing, and evaluation; development of student creativity through the solution of open-ended problems; individual instruction in design methodology. May be repeated for a maximum of three credits. *Preq:* E C E 330 or 409, consent of project supervisor.
- E C E 406, 606 Introduction to Microelectronics Processing 3(3,0)** Microelectronic processing, MOS and bipolar monolithic circuit fabrication, thick and thin film hybrid fabrication, applications to linear and digital circuits, fundamentals of device design. *Preq:* E C E 320. *Coreq:* MTHSC 311 or 434.
- E C E 409 Continuous and Discrete Systems Design 3(3,0)** Introduction to classical linear control systems. Topics include continuous and discrete descriptions of systems, time and frequency response, stability, system specification, system design of continuous and discrete systems. *Preq:* E C E 330. *Coreq:* E C E 495.
- E C E 410, 610 Modern Control Theory 3(3,0)** Introduction to modern control theory. Topics include fundamentals of matrix algebra, state space analysis and design, nonlinear systems and optimal control. *Preq:* E C E 409.
- E C E 412 Electrical Machines Laboratory 1(0,2)** Selected experiments to familiarize students with characteristics of transformers, DC and AC motors and generators. Measurement techniques and component modeling are included. *Coreq:* MTHSC 434 or consent of instructor. *Preq* or *Coreq:* E C E 360 or 419.
- E C E 417, 617 Elements of Software Engineering 3(3,0) [W.1]** Foundations of software design, reasoning about software, the calculus of programs, survey of formal specification techniques and design languages. *Preq:* E C E 329, 352, MTHSC 419.

E C E 418, 618 Power System Analysis 3(3,0) Study of power system planning and operational problems. Subjects covered are load flow, economic dispatch, fault studies, transient stability, and control of problems. System modeling and computer solutions are emphasized through class projects. *Preq:* E C E 360, 380.

E C E 419, 619 Electric Machines and Drives 3(3,0) Performance, characteristics, and modeling of AC and DC machines during steady-state and transient conditions. Introduction to power electronics devices and their use in adjustable speed motor drives. *Preq:* E C E 321, 360, 380. *Coreq:* MTHSC 434 or consent of instructor.

E C E 422, 622 Electronic System Design I 3(2,2) Emphasizes the application of theory and skills to the design, building, and testing of an electronic system with both analog and digital components. Application varies each semester. Extensive use is made of computer software tools in the design process. *Preq:* E C E 321, 330, 360, 371, 381.

E C E 427 Communications Systems 3(3,0) Study of communication systems design and analysis. Topics include signals and spectra, baseband signaling and detection in noise, digital and analog modulation and demodulation techniques, and communications link budget analysis. *Preq:* E C E 317, 330.

E C E 429, 629 Organization of Computers 3(3,0) Computer organization and architecture. Topics include a review of logic circuits, bus structures, memory organization, interrupt structures, arithmetic units, input-output structures, state generation, central processor organization, control function implementation, and data communication. Registered Transfer Language (RTL) for description and design of digital systems. *Preq:* CP SC 230 or E C E 250 or 272 or consent of instructor.

E C E 430, 630 Digital Communications 3(3,0) Study of digital communication systems. Topics include error-control coding, synchronization, multiple-access techniques, spread spectrum signaling, and fading channels. *Preq:* E C E 427.

E C E 431, 631 Digital Electronics 3(2,2) Electronic devices and circuits of importance to digital computer operation and to other areas of electrical engineering are considered. Active and passive wave shaping, waveform generation, memory elements, switching, and logic circuits are some of the topics. Experimentation with various types of circuits is provided by laboratory projects. *Preq:* E C E 321. *Coreq:* MTHSC 311 or 434.

E C E 432, 632 Instrumentation 3(3,0) Theory and analysis of transducers and related circuits and instrumentation. Generalized configurations and performance characteristics of instruments are considered. Transducer devices for measuring physical parameters such as motion, force, torque, pressure, flow, and temperature are discussed. *Preq:* E C E 321. *Coreq:* MTHSC 311 or 434.

E C E 436, 636 Microwave Circuits 3(3,0) Analysis of microwave networks comprising transmission lines, waveguides, passive elements, interconnects, and active solid state microwave circuits. Use of modern CAD tools to design RF/Microwave passive/active networks. Fabrication of typical circuits. *Preq:* E C E 381 or equivalent. *Coreq:* MTHSC 311 or 434.

E C E 438, 638 Computer Communications 3(3,0) Digital data transmission techniques, modems and communications channels, communications software and protocols, multiprocessors and distributed processing; concurrency and co-operation of dispersed processors. *Preq:* Senior standing in Electrical or Computer Engineering or Computer Science or consent of instructor.

E C E 439, 639 Fiber Optics 3(3,0) The underlying principles of design for optical fibers in practical systems are covered. Optical fiber as a waveguide is examined using wave optics and ray optics. Design criteria for using mono- and multi-mode fibers are discussed. Other topics include fabrication, measurement. *Preq:* E C E 381. *Coreq:* MTHSC 434 or consent of instructor.

E C E 440, 640 Performance Analysis of Local Computer Networks 3(3,0) Introduction to the design and performance analysis of local computer networks. Emphasis is on performance analysis of representative multi-access procedures. Three common types of networks are considered in detail. *Preq:* E C E 272, 317.

E C E 442, 642 Knowledge Engineering 3(3,0) Introduction to the theoretical and practical aspects of knowledge engineering or applied artificial intelligence. Topics include symbolic representation structures and manipulation, unification, production systems and structures, rule-based and expert systems, planning and AI system architectures; system design in PROLOG and LISP. Project is required. *Preq:* E C E 329, 352.

E C E 446, 646 Antennas and Propagation 3(3,0) Study of the theoretical and practical aspects of antenna design and utilization, input impedances, structural considerations, and wave propagation. *Preq:* E C E 330, 381 or 436, MTHSC 311 or 434.

E C E 449 Computer Network Security 3(1,4) Hands-on practicum in the administration and security of modern network service with emphasis on intrusion prevention techniques, detection, and recovery. *Preq:* Senior standing in Computer Engineering.

E C E 453 Software Practicum 3(1,6) Students design and implement a software system that satisfies both a requirements and specifications document. The resulting system is tested for compliance. *Preq:* E C E 329, 352.

E C E (M E) 456, 656 Fundamentals of Robotics 3(3,0) See M E 456.

E C E 459, 659 Integrated Circuit Design 3(2,2) Design concepts and factors influencing the choice of technology; fundamental MOS device design; silicon foundries, custom and semicustom integrated circuits; computer-aided design software/hardware trends and future developments; hands on use of CAD tools to design standard library cells; systems design considerations, testing, and packaging. *Preq:* E C E 321. *Coreq:* MTHSC 311 or 434.

E C E 460 Computer-Aided Analysis and Design 3(3,0) Principles and methods suited to the solution of engineering problems on the digital computer. Topics include widely used methods for the solution of the systems of algebraic and/or differential equations which arise in modeling of engineering systems, data approximation and curve fitting, continuous system simulation languages, and design-oriented programming systems. *Preq:* E C E 262, MTHSC 311, 434, or consent of instructor.

E C E 467, 667 Introduction to Digital Signal Processing 3(3,0) Introduction to characteristics, design, and applications of discrete time systems; design of digital filters; introduction to the Fast Fourier Transform (FFT); LSI hardware for signal processing applications. *Preq:* E C E 330.

E C E 468, 668 Embedded Computing 3(2,2) Principles of using computing in the larger context of a system. Topics include bus and processor design types (e.g. microprocessor, microcontroller, DSP), codes, digital circuit power management, real time scheduling, and embedded operating systems. Lab work consists of projects on embedded hardware (e.g. PC-104+). *Preq:* CP SC 212 and E C E 371 or consent of instructor.

E C E H491 Undergraduate Honors Research 1-6 Individual research projects conducted under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits.

E C E 492, 692 Special Problems 1-3(0,2) Special assignment in electrical or computer engineering. Some typical assignments include computer programs, term papers, technical literature searches, hardware projects, and design project leadership. May be taken only once for credit.

E C E 493, 693 Selected Topics 1-3(1-3,0) Classroom study of current and new technical developments in electrical and computer engineering. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

E C E 495 Integrated System Design I 2(1,3) [O.1] Engineering design of systems is considered in a continuous process of project definition, planning, execution, and evaluation. This process includes consideration of both technical and non-technical factors in design. Strong emphasis is placed on the development of effective technical communications skills, particularly oral communications competency. *Preq:* E C E 321, 330, 360, 371, 381 (three of which must have been completed prior to enrollment, with the remaining taken as prerequisite courses). *Coreq:* E C E 409 (in addition to any deficit courses in the prerequisites).

E C E 496 Integrated System Design II 2(0,6) [O.1] Project-oriented course which brings together electrical engineering students of dissimilar training into teams or project groups. Group assignments are made which are designed to develop an appreciation for individual and creative thinking as well as team effort. *Preq:* E C E 321, 330, 360, 371, 381, 409, 495.

ELEMENTARY EDUCATION

ED EL 321 Physical Education Methods for Classroom Teachers 3(3,0) Provides education majors with a basic understanding of the methods and techniques utilized in teaching elementary physical education. Emphasis is placed on acquiring a basic understanding of the movement education approach and the ability to teach integrated lessons utilizing this approach. *Prq:* Junior standing, admission to the professional level.

ED EL 401 Elementary Field Experience 3(0,9) Practical classroom experience prior to the student teaching semester for Elementary Education majors. For a twelve-week period, students spend two hours per week in schools observing, tutoring individuals, conducting small group activities, and teaching the class. To be taken Pass/Fail only. *Prq:* ED F 334; concurrent enrollment in ED EL 488 and READ 460; admission to the professional level.

ED EL 451 Elementary Methods in Science Teaching 3(3,0) Development of process skills, technical skills, and attitudes needed to foster increased confidence and commitment to the teaching of elementary science, with emphasis on teaching strategies and techniques and their implications for what we know of how children learn science. *Prq:* Elementary Education science requirements; concurrent enrollment in ED EL 401, 487, 488 and READ 460, admission to the professional level.

ED EL 452 Elementary Methods in Mathematics Teaching 3(3,0) Special emphasis is given the development of understanding, skills, and attitudes in the elementary curriculum with focus on strategies, techniques, and materials for teaching elementary mathematics. *Prq:* General Education mathematics requirement; admission to the professional level.

ED EL 458 Health Education Methods for the Classroom Teacher 3(3,0) [W.1] Study of the content, methodology, and resource materials necessary for teaching comprehensive health education in public schools. Emphasis is on the National Health Education Standards and the health behaviors of youth that are allied with the Coordinated School Health Program. *Prq:* Minimum grade point ratio of 2.0.

ED EL 481 Directed Teaching in the Elementary School 12(1,33) Supervised observation and teaching experiences in cooperation with selected elementary schools. Restricted to seniors or graduates who have completed prerequisite courses. *Prq:* ED EL 321, 401, 451, 452, 487, 488, READ 460; admission to the professional level, consent of area committee chair.

ED EL 487 Teaching Social Studies in the Elementary School 3(3,0) Introduction for pre-service teachers to the skills of social studies and methods, materials, and techniques needed to teach these skills to students in the elementary school. *Prq:* HIST 172, 173; GEOG 101 or 103; concurrent enrollment in ED EL 401, 451, 488 (for Elementary majors) and READ 460; admission to the professional level.

ED EL 488 Teaching the Language Arts in the Elementary School 3(3,0) [W.1] Introduction for pre-service teachers to the skills of the language arts other than reading and the methods, materials, and techniques needed to teach these skills to students in the elementary school. *Prq:* ENGL 102, 385; concurrent enrollment in ED EL 400, 450 (for Early Childhood majors); concurrent enrollment in ED EL 401, 451, 487 (for Elementary majors); READ 459, 460; admission to the professional level.

ENGINEERING

Professors: B. L. Sill, Director; Associate Professor: W. J. Park; Assistant Professor: M. W. Ohland; *Lecturers:* C. A. Balch, E. A. Stephen

ENGR 101 Introduction to Engineering 1(0,2) Introduction to the engineering profession and engineering disciplines for the purpose of assisting students in their selection of an engineering major. Professional ethics, technical communications, word processing, and electronic communications are taught. Credit toward a degree will be given for only one of ENGR 101 or CES 101.

ENGR 110 Engineering Problems Workshop 1(0,2) Workshop devoted to the analysis and solution of engineering-oriented problems. Representative problems taken from the different fields of engineering are used to illustrate such analytical and problem-solving techniques as estimation and approximation, numerical aids to computation, and solutions by graphical methods.

ENGR 120, H120 Engineering Problem Solving and Design 3(1,4) [C.1] Methodology and practice of engineering problem solving and engineering design. Selected computer tools, teamwork, and communication modes are employed. Ethics, safety, economics, and environmental concerns are considered. *Prq:* ENGR 101, MTHSC 106. *Coreq:* PHYS 122.

ENGR 130 Engineering Fundamentals 2(1,2) Provides students with experience in the design, construction, testing, analysis, and presentation of a team-based project. Project work includes dimensional analysis, statistics, advanced spreadsheet applications (conditional statements, functions), and sketching of designs. Additional activities include laptop-based instrumentation use in solving problems and graphical representation of various physical phenomena.

ENGR 150 Introduction to Materials 1(1,0) Introduction to materials used in modern technology. Different materials (metals, ceramics, and polymers) and different forms (bulk, fibers, gels, thin films, etc.) are discussed in the context of their application to consumer products, structural composites, refractories, biomedical implants, and electronic and optical materials. *Prq:* Enrollment in General Engineering or consent of instructor.

ENGR 180 Computers in Engineering 3(2,3) Introduction to the use of computers in engineering analysis, design, and communications. A high-level programming language and other software are used on microcomputers. *Prq:* Engineering major; knowledge of a computer language. *Coreq:* MTHSC 106.

ENGINEERING GRAPHICS

Lecturers: C. A. Balch, L. C. Cleveland, R. A. Emert

E G 208 Engineering Graphics with Computer Applications 2(1,3) Introduction of basic concepts in engineering graphics as a means of communication. Areas of study include theory of orthographic projections, descriptive modeling, and computer graphics. Credit toward a degree will be given for only one of E G 208 or 209. *Prq:* ENGR 120.

E G 209 Introduction to Engineering/Computer Graphics 2(1,3) [C.1] Introduction of basic graphical concepts needed for engineering application, including orthographic projections, descriptive modeling, and computer graphics. Credit toward a degree will be given for only one of E G 208 or 209. *Prq:* ENGR 120 or consent of instructor.

E G 412, 612 Interactive Computer Graphics 3(3,0) Graphics hardware and display technology; reduction and presentation of engineering data; techniques of geometrical transformations, perspective, and model manipulation; methodology of computer-aided design; application of higher-level software to engineering problems. *Prq:* E G 208 and MTHSC 208 or consent of instructor.

E G 490, 690 Special Topics in Engineering and Computer Graphics 1-3(1-3,0) Comprehensive study of any computer-aided topic in engineering graphics not covered in other courses. May be repeated for a maximum of six credits. *Prq:* Consent of instructor.

ENGINEERING MECHANICS

Professors: S. C. Anand, S. B. Biggers, R. H. Brown, J. M. Kennedy, E. H. Law; Associate Professor: P. F. Joseph, L. L. Thompson; Assistant Professor: J. D. Wood

E M 201, H201 Engineering Mechanics: Statics 3(3,0) Forces and force systems and their external effect on bodies, principally the condition of equilibrium. The techniques of vector mathematics are employed, and the rigor of physical analysis is emphasized. *Prq:* PHYS 122, MTHSC 206 (or concurrent enrollment).

E M 202, H202 Engineering Mechanics: Dynamics 3(3,0) Continuation of E M 201. Principal topics are kinematics and kinetics of particles and rigid bodies of finite size. Techniques of vector mathematics are employed. *Prq:* E M 201, MTHSC 206.

E M 304, H304 Mechanics of Materials 3(3,0) The relationships between external loads on solid bodies or members and the resulting internal effects and dimension changes, including the derivation of rational formulas for stresses and deformations and the identification and use of important mechanical properties of engineering materials. *Prq:* E M 201, MTHSC 206.

E M 320, H320 Fluid Mechanics 3(3,0) Behavior of fluids at rest or in motion, including the study of fluid properties. Emphasis is on a rational, analytical approach from which are developed basic principles of broad applicability to all fields of engineering. *Prq:* E M 202, M E 303 (or concurrent enrollment).

ENGLISH

Professors: R. E. Bartfield, A. Bennett, H. B. Bryant, W. K. Chapman, M. J. Charney, *Interim Chair*; S. K. Eisinger, M. J. Hilligoss, S. W. Howard, M. J. Jacobi, G. W. Koon, R. B. Palmer, F. W. Shilstone, D. H. Winchell, M. R. Winchell, C. H. Woodell, K. B. Yancey, A. P. Young; *Associate Professors:* B. A. Heifferon, L. W. Morrissey, C. Paul, E. Sparks; *Assistant Professors:* S. M. Ashton, T. A. Fishman, S. M. Gresham, H. H. Martin, K. L. Morris, D. Morton, M. R. Neal, T. Pierce, S. L. O'Sullivan, S. L. Smith, R. Van Cleave, S. D. Williams, S. Woodward; *Lecturers:* K. D. Apostel, K. Barnhardt, L. R. Brown-Presley, A. Cowden, P. S. Davis, H. E. Evans, B. Fralix, T. R. Flinchum, D. P. Galvin, L. A. Garren, J. R. Geist, K. H. Gentry, B. D. Hatley, W. H. Hearty, H. Hermann, J. D. Jackson, J. W. Kalles, C. R. Love, J. M. Mamon, M. A. McKenzie, R. O. Moffat, P. Neal, B. J. Ramirez, J. R. Smith, W. A. Stanton, A. N. Swords, N. T. Swords, T. Vosburgh, J. E. Wakefield, M. L. Walker

ENGL 101, H101 Composition I 3(3,0) Training in correct and effective expression in brief expository essays; review of the fundamentals of grammar and punctuation; instruction in common expository methods.

ENGL 102, H102 Composition II 3(3,0) Continued emphasis on correct and effective expression; training in the organization and writing of the research report. *Preq:* ENGL 101.

ENGL 103, H103 Accelerated Composition 3(3,1) Training in composing correct and effective expository and argumentative essays, including writing documented essays. Students placed in ENGL 103 receive credit for ENGL 101 after completing ENGL 103 with a C or better. *Preq:* Satisfactory score on departmental placement exam.

ENGL 111 English as a Second Language 3(3,2) Special course for students learning English as a second language. Intensive study and drill in American English pronunciation and listening comprehension. Required of all foreign students who do not make a satisfactory grade on screening examination in oral English. To be taken Pass/Fail only. Carries no credit for graduation.

ENGL 190 The Study of English 1(1,0) Orientation to the study of English language and literature and to the sources and methods of literary research. Required of all English majors and recommended for minors.

ENGL 202, H202 The Major Forms of Literature 3(3,0) Study of the basic structures and elements of fiction, poetry, and drama, including literary and critical theory, with readings in American, British, and world literature. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 203, H203 Survey of English Literature I 3(3,0) Chief British authors and works from Beowulf to the Romantic period. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 204, H204 Survey of English Literature II 3(3,0) Chief British authors and works from the Romantic period to 1945. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 205, H205 Survey of American Literature I 3(3,0) American literature to the Civil War, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 206, H206 Survey of American Literature II 3(3,0) American literature from the Civil War to 1945, with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 207, H207 Survey of World Literature I 3(3,0) Translations of continental European literature from Homer to the Renaissance (together with some Asian classics), with emphasis on major authors. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 208, H208 Survey of World Literature II 3(3,0) Translations of continental European literature from the 17th century to the present (together with some Asian classics), with emphasis on major writers. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL 209, H209 Contemporary Literature 3(3,0) Study of selected writers since 1945, primarily British and American. Proficiency in composition must be demonstrated. *Preq:* ENGL 102.

ENGL H210 Introduction to Literary Study 3(3,0) Literature and composition course for honors students who have exempted ENGL 101 and 102. Readings in American, English, and world literature and advanced training in writing and research. *Preq:* Exemption from ENGL 101 and 102 or consent of instructor.

ENGL 211 Introduction to the Writing and Publication Studies Major 3(3,0) Introduces the Writing and Publication Studies major and provides an overview of courses, possible writing interests within the major, and career possibilities. Students gain an understanding of the importance of theory, close reading, textual analysis, and research methodologies. Faculty representing various writing specialties present to students. *Preq:* ENGL 102.

ENGL 217 Vocabulary Building 3(3,0) Development of a useful discriminating vocabulary for writing, speaking, and reading. Student notebooks and proficiency quizzes. *Preq:* ENGL 102.

ENGL 231 Introduction to Journalism 3(3,0) Instruction and practice in writing for mass media; editorial responsibilities. *Preq:* ENGL 102.

ENGL 265 Introduction to Editing 3(3,0) Introduction to the practice of editing texts. Includes instruction in the principles and symbols of copyediting and proof-reading as well as work with electronic editing tools. Also addresses editor's role in different types of editing, including copyediting, comprehensive editing, and developmental editing for paper and electronic publication.

ENGL (G W) 301, H301 Great Books of the Western World 3(3,0) See G W 301.

ENGL 304 Business Writing 3(3,0) [W.3] Introduction to business writing: memoranda, letters, reports, research methods. *Preq:* Junior standing.

ENGL 310 Critical Writing about Literature 3(3,0) [W.2] Terms and techniques for literary analysis, including close reading, vocabulary for analysis, research and writing skills, casebook study of critical approaches. Discussion of poetry and genres preferred. *Preq:* Sophomore literature (or concurrent enrollment) or consent of instructor.

ENGL 312 Advanced Expository Writing 3(3,0) [W.3] Workshop in practical writing focusing on principles and style. *Preq:* Sophomore literature or consent of instructor.

ENGL 314, H314 Technical Writing 3(3,0) [W.3] Intensive training in the fundamentals of technical writing: reports, letters, and memoranda. *Preq:* Junior standing.

ENGL 316 Writing and International Trade 3(3,0) [W.3] Students complete projects demanding a variety of communications skills that professionals in international trade need; sensitivity to foreign audiences and cultures in oral and written communication, electronic and graphic communication, collaborative writing and management. *Preq:* Sophomore literature.

ENGL 330 Approaches to Technical Communication 3(3,0) Overview of major conceptual and theoretical approaches to technical communication. *Preq:* ENGL 211.

ENGL 332 Visual Communication 3(3,0) Hands-on survey of visual communication theories and practices used by technical communicators in business and industry environments. Class meets regularly in computer classrooms. *Preq:* Sophomore literature; ENGL 211 or consent of instructor.

ENGL 333 Reporting for the News Media 3(3,0) [W.3] Practical experience in gathering and writing news and feature copy for the media, concentrating on print journalism; examination of the role of the modern journalist; laws governing the profession; journalistic ethics. *Preq:* ENGL 231 or consent of instructor.

ENGL 334 Feature Writing 3(3,0) [W.3] Practical experience in writing feature articles for newspapers, magazines, and free-lance markets. *Preq:* ENGL 231 or consent of instructor.

ENGL 335 Editing for Newspapers 3(3,0) Examination of the editing process of newspapers and magazines. Practical experience in article selection, copy-editing, headline writing, and page design. *Preq:* ENGL 231 or consent of instructor.

ENGL 345 The Structure of Fiction 3(3,0) [W.3] Introduction to the creative writing and critical study of prose fiction. *Preq:* ENGL 310 or consent of instructor.

ENGL 346 The Structure of Poetry 3(3,0) [W.3] Introduction to the creative writing and critical study of poetry. *Preq:* ENGL 310 or consent of instructor.

ENGL (THEA) 347 The Structure of Drama 3(3,0) See THEA 347.

ENGL 348 The Structure of the Screenplay 3(3,0) [W.3] Introduction to the creative writing and critical study of the screenplay. Screenplays vary from semester to semester. May be repeated once for credit with consent of instructor. *Preq:* ENGL 310 or consent of instructor.

ENGL 350 Mythology 3(3,0) Study of the great myths of the world with an emphasis on their applications to literature. *Preq:* ENGL 310 or consent of instructor.

ENGL 351 American Folklore 3(3,0) Study of American folklore with an emphasis on such considerations as the folklore, folk songs and ballads, folk heroes, and folk superstitions and remedies. *Prq:* ENGL 310 or consent of instructor.

ENGL 353 Ethnic American Literature 3(3,0) Critical examination of essays, poetry, fiction, and drama written by members of a variety of American racial and ethnic groups, such as Native Americans, African-Americans, Chicano/Mexican Americans, Asian Americans, Italian Americans, and American Jews. *Prq:* ENGL 310 or consent of instructor.

ENGL 355 Popular Culture 3(3,0) Examination of the nature, functions, history, and impact upon American society of best sellers, popular magazines, television, movies, and other like phenomena. *Prq:* ENGL 310 or consent of instructor.

ENGL 356 Science Fiction 3(3,0) Readings in science fiction from the 17th century to the present, with special emphasis on writers since Verne and Wells. *Prq:* ENGL 310 or consent of instructor.

ENGL 357 Film 3(2,3) Examination of the film medium as an art form: its history, how films are made, why certain types of films (western, horror movies, etc.) have become popular, and how critical theories provide standards for judging film. *Prq:* ENGL 310 or consent of instructor.

ENGL 359 Special Topics in Language, Literature, or Culture 3(3,0) Studies in varied topics not central to other English courses, such as Literature and Art/Business/Sports; Language and Style; Black Literature. Specific titles and course descriptions to be announced from semester to semester. May be repeated once with department chair's consent. *Prq:* ENGL 310 or consent of instructor.

ENGL H367 Special Topics for Honors Students 3(3,0) Varied topics of general interest in literature, language, rhetoric, or culture for all honors students. Specific topics announced from semester to semester. May be repeated for a maximum of nine credits. *Prq:* ENGL 310 or consent of instructor.

ENGL 380 British and American Women Writers 3(3,0) Poetry, drama, fiction, and prose by established and little-known women writers in Britain and America. Particular attention to works treating themes and issues concerning women's lives. Readings on such topics as women and work, education, religion, creativity. *Prq:* ENGL 310 or consent of instructor.

ENGL 385 Children's Literature 3(3,0) Reading and analysis in a wide range of authors, illustrators, and genres appropriate for children from preschool through eighth grade, classic as well as modern. Critical approaches include historical, thematic, and social. *Prq:* ENGL 310 or consent of instructor.

ENGL 386 Adolescent Literature 3(3,0) [W.2] Reading and analysis of literature written for readers age 12–18. Emphasis is on historical context, chief themes and motifs, and censorship issues, as well as connections with classic literature. *Prq:* ENGL 310 or consent of instructor.

ENGL 387 Book History 3(3,0) Examines the material and theoretical constructions of the book. Covers both historical and contemporary dimensions of dissemination, reception, artistry, and influence of books. *Prq:* ENGL 102.

ENGL 400, 600 The English Language 3(3,0) Studies in English usage and historical development of the language. *Prq:* ENGL 310 or consent of instructor.

ENGL 401, 601 Grammar Survey 3(3,0) Survey of modern grammars with a focus on exploring the impact structural grammar has had on traditional grammar. Recommended for English teachers. *Prq:* ENGL 310 or consent of instructor.

ENGL 403 The Classics in Translation 3(3,0) Examination of Homer's *Iliad* and *Odyssey*, Virgil's *Aeneid*, and Ovid's *Metamorphoses*. A few shorter works by other Greek and Roman writers may also be read. *Prq:* ENGL 310 or consent of instructor.

ENGL 404 Classical Drama 3(3,0) Selected reading in the dramatic literature of classical Greece and Rome. *Prq:* ENGL 310 or consent of instructor.

ENGL 405, 605 Studies in English Literature to 1700 3(3,0) Selected reading in English literature from the beginnings to 1700, with emphasis on social and intellectual backgrounds. *Prq:* ENGL 310 or consent of instructor.

ENGL 406, 606 Studies in English Literature Since 1700 3(3,0) Selected readings in English literature from 1700 to the present, with emphasis on social and intellectual backgrounds. *Prq:* ENGL 310 or consent of instructor.

ENGL 407, 607 The Medieval Period 3(3,0) Selected works of Old and Middle English literature, exclusive of Chaucer. *Prq:* ENGL 310 or consent of instructor.

ENGL 408, 608 Chaucer 3(3,0) Selected readings in Middle English from *The Canterbury Tales* and other works by Chaucer. *Prq:* ENGL 310 or consent of instructor.

ENGL 409, 609 The Earlier English Renaissance 3(3,0) Tudor and Elizabethan poetry, prose, fiction, translations, essays, and criticism. *Prq:* ENGL 310 or consent of instructor.

ENGL 410, 610 Drama of English Renaissance 3(3,0) Selected readings in non-Shakespearean dramatic literature of the 16th and 17th centuries. *Prq:* ENGL 310 or consent of instructor.

ENGL 411, 611 Shakespeare 3(3,0) Study of selected tragedies, comedies, and history plays of Shakespeare. Required of all English majors. *Prq:* ENGL 310 or consent of instructor.

ENGL 412, 612 Studies in Shakespeare 3(3,0) Special topics in Shakespeare as selected by instructors. May be repeated once with department chair's consent. *Prq:* ENGL 310 or consent of instructor.

ENGL 413, 613 Later English Renaissance 3(3,0) Non-dramatic poetry and prose from Ben Jonson, John Donne, and Francis Bacon through Andrew Marvell and John Bunyan, excluding Shakespeare and Milton. *Prq:* ENGL 310 or consent of instructor.

ENGL 414, 614 Milton 3(3,0) Development of Milton's art and thought from the minor poems and selected prose through *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*, set against the background of the late Renaissance. *Prq:* ENGL 310 or consent of instructor.

ENGL 415, 615 The Restoration and Eighteenth Century 3(3,0) Readings in Dryden, Swift, Pope, and Dr. Johnson. *Prq:* ENGL 310 or consent of instructor.

ENGL 416, 616 The Romantic Period 3(3,0) Readings from the poetry and critical prose of Blake, Wordsworth, Coleridge, Byron, Shelley, Keats, and other representative figures. *Prq:* ENGL 310 or consent of instructor.

ENGL 417, 617 The Victorian Period 3(3,0) Reading from the poetry and nonfiction prose of selected Victorian authors, including works of Carlyle, Tennyson, Browning, Arnold, and other representative figures. *Prq:* ENGL 310 or consent of instructor.

ENGL 418, 618 The English Novel 3(3,0) Study of the English novel from its 18th century beginnings through the Victorian Period. *Prq:* ENGL 310 or consent of instructor.

ENGL 422, 622 American Literature I 3(3,0) Major American authors and movements from the Colonial period to the Civil War. *Prq:* ENGL 310 or consent of instructor.

ENGL 423, 623 American Literature II 3(3,0) Major American authors and movements from the Civil War to the early 20th century. *Prq:* ENGL 310 or consent of instructor.

ENGL 424, 624 American Literature III 3(3,0) Major American authors and movements of the 20th century. *Prq:* ENGL 310 or consent of instructor.

ENGL 425, 625 The American Novel 3(3,0) Survey of the most significant forms and themes of the American novel from its beginnings to 1900. *Prq:* ENGL 310 or consent of instructor.

ENGL 426, 626 Southern Literature 3(3,0) Intellectual and literary achievement of the South from 1607 to the present, with emphasis on the writers of the 19th century. *Prq:* ENGL 310 or consent of instructor.

ENGL 427, 627 Agrarianism and the Humanistic Tradition 3(3,0) Focuses on the importance of agriculture and rural life to the humanistic tradition of Western Civilization from antiquity through the early years of the American republic. *Prq:* ENGL 310 or consent of instructor.

ENGL 430, 630 Modern Drama 3(3,0) Principles and progress of drama from Ibsen to the present; analysis of representative plays; critical reports; discussion of trends in contemporary drama. *Prq:* ENGL 310 or consent of instructor.

ENGL 431, 631 Modern Poetry 3(3,0) The modern tradition in English and American poetry from Yeats to the present; relevant critical essays. *Prq:* ENGL 310 or consent of instructor.

ENGL 432, 632 Modern Fiction 3(3,0) American and British novels and short stories of the 20th century. *Prq:* ENGL 310 or consent of instructor.

ENGL 433, 633 The Anglo-Irish Literary Tradition 3(3,0) Exploration of the unique literary heritage and achievement of English-language Irish writers in the 19th and 20th centuries. Major figures of the Irish tradition: W. B. Yeats, James Joyce, Samuel Beckett, and other writers; consideration of the specifically Irish aspects of their works. *Preq:* ENGL 310 or consent of instructor.

ENGL 434, 634 Environmental Literature 3(3,0) Survey of literature that examines the relationship between human beings and the natural world, including analysis of environmental themes in myths and legends and in selected poetry and prose of 19th- and 20th-century England and America. *Preq:* ENGL 310 or consent of instructor.

ENGL 435, 635 Literary Criticism 3(3,0) Major critical approaches to literature. *Preq:* ENGL 310 or consent of instructor.

ENGL 436, 636 Feminist Literary Criticism 3(3,0) Introduction to the germinal works of feminist literary theory and criticism. Outlines the development of modern literary criticism by studying feminist versions of the major critical methodologies. *Preq:* ENGL 310 or consent of instructor.

ENGL 437, 637 Directed Studies 1-3(1-3,0) Class and tutorial work for students with special interests or projects in American, British, or European literature outside the scope of existing courses. Applications must be approved during the registration period of the semester preceding the one in which directed studies will occur. May be repeated by arrangement with the department. *Preq:* ENGL 310 or consent of instructor.

ENGL H438 Departmental Honors Research 3(3,0) Research for the preparation of an honors project. *Preq:* ENGL 310 or consent of instructor.

ENGL H439 Departmental Honors Project 3(3,0) Preparation of an honors project. *Preq:* ENGL 310 or consent of instructor.

ENGL 440, 640 Literary Theory 3(3,0) Examination of how approaches such as Marxism, Psychoanalysis, Feminism, Deconstruction, New Historicism, Post-Colonialism, Cultural Studies, and Queer Theory answer the question, "What is literature?" *Preq:* ENGL 310 or consent of instructor.

ENGL 441 Literary Editing 3(3,0) Examination of how the theories and practices of editing construct texts, stressing the problems and objectives of editing and providing practical experience with literary editing. *Preq:* Sophomore literature.

ENGL 445, 645 Fiction Workshop 3(3,0) Workshop in the creative writing of prose fiction. May be repeated once for credit. *Preq:* ENGL 310 or consent of instructor.

ENGL 446, 646 Poetry Workshop 3(3,0) Workshop in the creative writing of poetry. May be repeated once for credit. *Preq:* ENGL 310 or consent of instructor.

ENGL (THEA) 447, 647 Playwriting Workshop 3(0,3) [W.3] See THEA 447.

ENGL 448, 648 Screenwriting Workshop 3(3,0) [W.3] Workshop in the creative writing of screenplays. May be repeated once for credit. *Preq:* ENGL 310 or consent of instructor.

ENGL 450, 650 Film Genres 3(2,3) Advanced study of films that have similar subjects, themes, and techniques, including such genres as the Western, horror, gangster, science fiction, musical, and/or screwball comedy. Also considers non-traditional genres, screen irony, genre theory, and historical evolution of genres. Topics vary. *Preq:* ENGL 310 or consent of instructor.

ENGL 451, 651 Film Theory and Criticism 3(2,3) Advanced study into the theory of film/video making with an emphasis on understanding a variety of critical methods to approach a film. Examines the history of film theory and defines the many schools of film criticism, including realism, formalism, feminism, semiotics, Marxism, and expressionism. *Preq:* ENGL 310 or consent of instructor.

ENGL 452, 652 Great Directors 3(2,3) Intensive study of one to three film directors with an emphasis on understanding the entire canon of each director. Students study similarities in techniques, shifts in thematic emphasis, and critical methodologies for approaching the works of each director. Topics vary. *Preq:* ENGL 310 or consent of instructor.

ENGL 453, 653 Sexuality and the Cinema 3(2,3) Examination of male/female sexual roles and their evolution in American genre films, avant-garde cinema, and international films. Includes the study of movies in relation to cultural values and social stereotypes, introduction to feminist film theory, and consideration of film pornography. *Preq:* ENGL 310 or consent of instructor.

ENGL (LANG) 454 Selected Topics in International Film 3(2,3) See LANG 454.

ENGL 455, 655 American Humor 3(3,0) Native American humor of the 19th and 20th centuries. *Preq:* ENGL 310 or consent of instructor.

ENGL (HUM) 456, 656 Literature and Arts of the Holocaust 3(3,0) Addresses the Holocaust through literature, art, architecture, music, and film. Beginning with historical, political, and economic forces that contributed to the Holocaust, course then focuses on highly diverse creative responses to this event—responses that often reflect the difficulties and politics of these commemorative gestures. *Preq:* ENGL 310 or consent of instructor.

ENGL 459, 659 Advanced Special Topics in Language, Literature, or Culture 3(3,0) Advanced studies in topics not central to other English courses, such as certain authors, works, genres, themes, or areas of knowledge and culture. Specific topics are announced when offered. May be repeated once for credit with department chair's consent. *Preq:* ENGL 310 or consent of instructor.

ENGL 460 Issues in Writing Technologies 3(3,0) Examination of writing technologies from different historical periods. Investigates how writing is understood, circulated, legislated, and protected in terms of its production technology. *Preq:* Sophomore literature; ENGL 211 or consent of instructor.

ENGL 470 Views of Literacy 3(3,0) Examines what it means to be or become literate from perspectives of literature, composition, classics, education, anthropology, linguistics, psychology, history. *Preq:* Sophomore literature, one 300-level writing course.

ENGL 475, 675 Writing for Electronic Media 3(3,0) Hands-on workshop in new forms of writing and hypertextual design for interactive electronic media. May be repeated once for credit. *Preq:* ENGL 310 or consent of instructor.

ENGL 478, 678 Digital Literacy 3(3,0) Examines how electronic texts differ from and resemble print texts. Includes reading, studying, and analyzing print and digital texts to determine how digital techniques change patterns of reading and how readers make sense of electronic texts. *Preq:* ENGL 310 or consent of instructor.

ENGL 482, 682 African American Fiction and Nonfiction 3(3,0) Critical examination of the various forms and genres of African American prose including the novel, short fiction, autobiography, nonfiction, and oratory with some attention to emerging theories about African American culture and its impact on American cultural life in general. *Preq:* ENGL 310 or consent of instructor.

ENGL 483, 683 African American Poetry, Drama, and Film 3(3,0) Studies in the various forms, themes, and genres of African American poetry, drama, and film with some attention to emerging theories about African American culture and its impact on American cultural life in general. *Preq:* ENGL 310 or consent of instructor.

ENGL 485, 685 Composition for Teachers 3(3,0) Practical training in teaching composition: finding workable topics, organizing and developing observations and ideas, evaluating themes, and creative writing. *Preq:* ENGL 310 or consent of instructor.

ENGL 490, 690 Advanced Technical and Business Writing 3(3,0) Advanced work in writing proposals, manuals, reports, and publishable articles. Students produce work individually and in groups. *Preq:* ENGL 310 or consent of instructor.

ENGL (COMM) 491, 691 Classical Rhetoric 3(3,0) Study of the major texts in classical rhetoric. Examines the nature and functions of rhetoric in Greek and Roman societies. Traces the development of rhetoric from Protagoras through Isocrates, Plato, Aristotle, Cicero, and Quintilian and considers questions essential to understanding persuasive theory and practices. *Preq:* ENGL 310 or consent of instructor.

ENGL (COMM) 492, 692 Modern Rhetoric 3(3,0) Examines the "new rhetorics" of the 20th century, which are grounded in classical rhetoric but which include findings from biology, psychology, linguistics, and anthropology, among other disciplines. Considers the theories and applications of communication. *Preq:* ENGL 310 or consent of instructor.

ENGL 494, 694 Writing About Science 3(3,0) Advanced work in scientific writing and editing for peer and lay audiences. *Preq:* ENGL 310 or consent of instructor.

ENGL 495, 695 Technical Editing 3(3,0) Practical experience in editing and preparing technical manuscripts for publication. General introduction to the functions of the technical editor. *Preq:* ENGL 310 or consent of instructor.

ENGL 496 Senior Seminar 3(3,0) Capstone course; requires participation and a substantial essay; allows graduating English majors the chance to work closely with faculty and other English majors on a special topic in the advanced study of literature. Fulfills English major distribution requirements. *Preq:* ENGL 310, Senior standing in English, or consent of instructor.

ENGL 499 Practicum in Writing 3(3,0) Students apply their knowledge of concepts and principles to a substantive project involving their internship experiences and/or writing and publishing interests. To be taken Pass/Fail only. *Preq:* Sophomore literature, Junior standing in English.

ENTOMOLOGY

Professors: P. H. Adler, G. R. Carner, J. D. Culina, Chair, C. S. Gorsuch, W. M. Hood, J. C. Morse, P. A. Zungoli; *Assistant Professor:* M. W. Turnbull

ENT 200 Six-Legged Science 3(3,0) Introduction to insects, their various relationships with humans, other animals, and plants. The general nature of this course makes it beneficial to all students regardless of specialty. Closed to students who have had ENT 301 or equivalent.

ENT 201 Selected Topics 1(1,0) Discussion course covering topics dealing with insects and related arthropods. Subjects are chosen to reflect issues of current interest as well as those having significance in human history. May be repeated for a maximum of three credits.

ENT 300 Environmental Entomology 3(3,0)S Exploration of diversity and roles of insects in natural and affected environments, impact of insects and pesticides on environmental quality, and discussion of environmental ethics in entomological science. *Preq:* Any biological or physical science.

ENT (BIOSC) 301 Insect Biology and Diversity 4(3,3)F Introduction to the study of insects, with emphasis on their structure, function, ecology, and behavior. Identification of commonly encountered species is highlighted. Relationships between insect and human populations are discussed. Control technologies are introduced, with emphasis on environmentally responsible tactics.

ENT 305 Presentation of Scientific Information 3(2,2) [O,2]F Instruction and practice in delivering oral presentations of scientific information and preparing visual aids. Emphasis is on oral scientific presentations for various target groups including scientists, service technicians, growers, amateur enthusiasts, the general public, and other audiences in which scientific information is transferred.

ENT 308 Apiculture 3(2,3)S Even-numbered years. Detailed study of the honey bee and its economic importance in pollination and honey production. Attention is given to bee behavior, colony management, equipment, honey-plant identification, and honey production and processing. *Preq:* BIOL 104 and consent of instructor.

ENT (BIOSC) 400, H400, 600 Insect Morphology 4(3,3)F Even-numbered years. Study of insect structure in relation to function and of the variation of form in insects. *Preq:* ENT 301.

ENT 401, H401, 601 Insect Pests of Ornamental Plants and Shade Trees 3(2,3)F Odd-numbered years. Recognition, biology, damage, and control of insect pests of woody and other ornamental plants and shade trees. *Preq:* ENT 301.

ENT 404, H404, 604 Urban Entomology 3(2,3)F Even-numbered years. Study of pests common to the urban environment with emphasis on biology, damage, control, and identification of household, structural, stored products, and food pests. Students learn both theoretical and practical aspects of urban pest management and the pest-control industry. *Preq:* ENT 301.

ENT (PL PA) 406, H406, 606 Diseases of Insects and Turfgrasses 3(2,2)F See PL PA 406.

ENT 407, 607 Applied Agricultural Entomology 4(3,3)F Even-numbered years. Topics include recognition, biology, damage, and control of economically important insects and mites found on major Southeastern field, fruit, nut, and vegetable crops. Principles and practices of crop protection, including pesticide application, economic basis for decision making, and development of scouting programs are introduced. *Preq:* ENT 301 or equivalent.

ENT (BIOSC) 415, 615 Insect Taxonomy 3(1,6)S Odd-numbered years. Identification of the principal families of the major orders of adult insects. Laboratory work consists of intensive practice of such identification; lecture material deals with theoretical discussion of taxonomic features observed in the laboratory. *Preq:* ENT 405 or consent of instructor.

ENT (BIOSC, ENTOM) 430, 630 Toxicology 3(3,0)F Odd-numbered years. See ENTOM 430.

ENT (BIOSC) 436, 636 Insect Behavior 3(2,3)F Odd-numbered years. Fundamentals of insect behavior in an evolutionary and ecological perspective. Laboratory emphasizes generation and testing of hypotheses and observation, description, and quantification of insect behavior. *Preq:* ENT 301 or consent of instructor.

ENT (BIOSC) 455, H455, 655 Medical and Veterinary Entomology 3(2,3) Odd-numbered years. Insects and their arthropod relatives which are of economic importance in their effect on man and animals. *Preq:* ENT 301 or consent of instructor.

ENT 461 Directed Research in Entomology 1-3(0,3-9) Development of a senior thesis based on a research problem in a selected entomological area. Emphasis is on integrating the knowledge gained in the student's program with the results of the research project. May be repeated for a maximum of three credits. *Preq:* Senior standing, consent of instructor.

ENT 462, 662 Seminar Presentation 1(1,0) [O,1] Advanced instruction and practice in delivering oral seminar presentations of scientific information. Emphasis is on preparing visual aids, organization, content, and practice in speaking to a specialized scientific audience.

ENT (BIOSC, W F B) 469, H469, 669 Aquatic Insects 3(1,6)S Odd-numbered years. Identification, life history, habitats, and interrelationships of aquatic insects; techniques of qualitative field collecting; important literature and research workers. *Preq:* ENT 301 or consent of instructor.

ENT 490 Practicum 1-4 Supervised entomological learning opportunity providing highly individualized experiences to complement other programs and courses. Must be prearranged at least two months in advance. Must file written reports midway during enrollment period and at its conclusion. Must appear for oral evaluation at the end of the period. *Preq:* Junior standing and consent of instructor.

ENT (GEN) 495, 695 Insect Biotechnology 3(3,0)S Even-numbered years. Considers many unique genetic features exhibited by insects and describes the applications of biotechnology to enhance useful products from insects and to affect the control of destructive insects. *Preq:* ENT 301, GEN 302.

ENVIRONMENTAL AND NATURAL RESOURCES

Professors: J. D. Culina, J. W. Foltz, R. L. Hedden, P. A. Layton, J. R. Sweeney, *Coordinator*; G. W. Wood, T. E. Wooten; *Associate Professors:* M. Espey, V. B. Shelburne; *Assistant Professors:* J. D. Lanhams, C. J. Post

E N R 101 Introduction to Environmental and Natural Resources I 1(1,0) Informative overview of environmental and natural resources and their impact on society. Education and career opportunities are emphasized.

E N R 102 Introduction to Environmental and Natural Resources II 1(1,0) Continuation of E N R 101 with continuing emphasis on education and career opportunities. Current issues and basic science related to the natural resources professions are introduced.

E N R 302 Natural Resources Measurements 3(2,3) Introduction to measurements of natural resources including land, vegetation, animal habitat, water quality and quantity, climate, and recreation. Remote sensing techniques are also introduced. May not be taken for credit by Forest Resource Management majors. *Coreq:* EX ST 301.

E N R (BIOSC) 413 Restoration Ecology 3(3,0) Applies ecological principles to the restoration of disturbed terrestrial, wetland, and aquatic ecosystems. Includes the restoration of soils and waterways, of flora and fauna, and of natural ecological processes such as plant succession and nutrient cycling. *Preq:* Introductory course in ecology or conservation biology, consent of instructor.

E N R (FOR) 416 Forest Policy and Administration 2(2,0) See FOR 416.

E N R (C R P) 434 Geographic Information Systems for Landscape Planning 3(1,6) See C R P 434.

E N R 450, 650 Conservation Issues 3(3,0) Interactive study and discussion of issues related to the conservation of natural resources, emphasizing current issues in the conservation of biodiversity, identification of conflicting issues between consumptive and nonconsumptive resource management, and development of viable solutions for conservation of natural resources. *Preq:* W F B (BIOSC) 313 or consent of instructor.

ENVIRONMENTAL ENGINEERING AND SCIENCE

Professors: A. W. Elzerman, *Director*; R. W. Falta, R. A. Field, T. M. Keinath, F. J. Mole, J. D. Navratil, T. J. Overcamp, *Associate Professors*: J. T. Coates, Jr., *Research Associate*; T. A. Devol, D. L. Freedman, T. Karanfil, C. M. Lee, L. Murdoch, *Assistant Professors*: M. E. Carraway, C. S. Christoforou, M. A. Schlaurman; *Lecturer*: M. L. Thompson

EE&S 401, 601 Environmental Engineering 3(3,0) Introduction to the field of environmental engineering. Topics include environmental phenomena, impact of pollutants in the aquatic environment, solid-waste management, air pollution control, radiological health, and simple water and wastewater treatment systems. *Prerequisite*: Junior standing in engineering or consent of instructor. *Coreq*: C E 341, CHE 311, E M 320, or consent of instructor.

EE&S 402, 602 Water and Waste Treatment Systems 3(3,0) Study of fundamental principles, rational design considerations, and operational procedures of the unit operations and processes employed in water and waste treatment. Both physicochemical and biological treatment techniques are discussed. Introduction to the integration of unit operations and processes into water and waste treatment systems. *Prerequisite*: C E 341, CHE 311, E M 320 or consent of instructor.

EE&S 410, 610 Environmental Radiation Protection 1 3(3,0) Fundamental principles of radiological health and radiation safety. Topics include radiation fundamentals, basic concepts of environmental radiation protection, internal and external dosimetry, environmental dose calculations and radiation protection standards. *Prerequisite*: Consent of instructor.

EE&S 411, 611 Ionizing Radiation Detection and Measurement 3(2,3) Laboratory exercises in ionizing radiation detection and measurements. Topics include nuclear electronics; counting statistics; radiation interactions; basic gas, scintillation, and semiconductor detectors; gamma-ray spectroscopy; health physics survey instrumentation; and thermoluminescent dosimetry. *Prerequisite*: EE&S 410 or consent of instructor.

EE&S 430, 630 Air Pollution Engineering 3(3,0) Introductory course in air pollution and its control. Topics include air pollutants and effects, sources, dispersion models, engineering controls, and air-quality legislation. *Prerequisite*: Senior standing in engineering or physical sciences.

EE&S (B E, FOR) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) See B E 451.

EE&S 480, 680 Environmental Risk Assessment 3(3,0) Quantitative estimation of human health risk posed by the release of a contaminant to the environment. Topics include methods for analyzing emission rate, environmental transport, exposure, and health effects; methods of uncertainty analysis; and the role of risk assessment in environmental regulation and environmental decision making. *Prerequisite*: EE&S 401 or consent of instructor.

EE&S (B E, IE) 484, 684 Municipal Solid Waste Management 3(3,0) Introduction to the problems, regulations, collection, handling, recycling,

and disposal of municipal solid wastes in the urban and rural sectors. Emphasis is on an integrated waste-management system with resource recovery, composting, incineration, landfill disposals and their costs. *Prerequisite*: Senior standing in engineering or science or consent of instructor.

EE&S 485, 685 Hazardous Waste Management 3(3,0) Introduction to the problems, regulations, treatment, and ultimate disposal of hazardous and toxic materials. Spill cleanup, groundwater transport, land disposal, incineration, and treatment technologies are discussed. *Prerequisite*: EN SP 200 or EE&S 401 or consent of instructor; two semesters of general chemistry.

EE&S 486, 686 Pollution Prevention and Industrial Ecology 3(3,0) Topics include pollution prevention technology, the role of pollution prevention within a corporation, source reduction and recycling assessments, treatment to reduce disposal, life-cycle assessment, design for environment, and industrial ecology. Emphasis is on case studies. *Prerequisite*: Senior standing in College of Engineering and Science.

EE&S 490, H490, 690 Special Projects 1-3 1(3-3,0) Studies or laboratory investigations on special topics in the environmental engineering and science field. Arranged on a project basis with a maximum of individual student effort and a minimum of staff guidance. May be repeated for a maximum of three credits. *Prerequisite*: Consent of the instructor.

EE&S 491 Selected Topics in Environmental Engineering 1-3 Study of the dynamic role of environmental engineering in maintaining environmental quality. A comprehensive study of any phase of environmental engineering. May be repeated for credit, but only if different topics are covered. *Prerequisite*: Consent of department chair.

ENVIRONMENTAL SCIENCE AND POLICY

Professors: A. W. Elzerman, *Coordinator*; R. E. Franklin, W. H. Leonard, E. M. Murrow, J. E. Schindler, T. B. Yandle, Jr.; *Associate Professors*: L. D. Fredendall, J. B. London, W. F. Steirer, J. R. Wagner

EN SP 200 Introduction to Environmental Science 3(3,0) Basic principles of environmental science including ecology, energy, resources, waste management; and air, water, and soil pollution. Consideration of issues, specific cases, investigative approaches, and remedial actions. *Prerequisite*: Sophomore standing and two semesters of either freshman chemistry or biology.

EN SP (AGRIC) 315, H315 Environmental and Agriculture 3(3,0) See AGRIC 315.

EN SP 400 Studies in Environmental Science 3(3,0) Study of historical perspectives, attitudes, and government policy within the framework of environmental case studies to illustrate the interaction between human and natural factors as they mutually affect the environment and man's ability to deal with that environment. *Prerequisite*: EN SP 200 or consent of instructor.

EN SP 471, 671 Man and His Environment 2(2,0) The interaction of man with his environment is surveyed. Factors such as urbanization, population growth, pathogens, disease vectors, ionizing radiation, sewage disposal, and noise control are consid-

ered. Effects of environmental contacts with air, water, food, and solid and liquid wastes are emphasized. *Prerequisite*: Consent of instructor.

EN SP 472, 672 Environmental Planning and Control 2(2,0) Application of planning and control to effective environmental quality improvement. Water supply and treatment, wastewater treatment and disposal, solid waste disposal, air pollution abatement, and land use and zoning are considered from the standpoint of control. Not intended for graduate students in engineering. *Prerequisite*: Consent of instructor.

ENVIRONMENTAL TOXICOLOGY

Professors: S. J. Klaine, C. D. Rice, J. H. Rodgers; *Assistant Professors*: W. W. Bowerman, E. R. Carraway, A. R. Johnson, M. A. Schautman, P. van den Hurk

ENTOX 400, H400, 600 Wildlife Toxicology 3(3,0) Assessment of impacts of toxic substances on reproduction, health, and well-being of wildlife species; acute and chronic effects of agricultural chemicals, pesticides, hazardous waste, industrial waste, and oil releases are discussed. *Prerequisite*: BIOCH 305 or organic chemistry, one year of general biology, W F B 350 or consent of instructor.

ENTOX 421, H421, 621 Chemical Sources and Fate in Environmental Systems 3(3,0) Chemical cycles in the environment are discussed on global and microcosm scales. The dependence of fate processes on physical and chemical properties and environmental conditions is examined. Breakdown, movement, and transport of selected toxicants are addressed to illustrate the mechanisms that govern chemical fate. *Prerequisite*: Organic and analytical chemistry or consent of instructor.

ENTOX (BIOSC, ENT) 430, 630 Toxicology 3(3,0) F Old-numbered years. Basic principles of toxicology including quantitation of toxicity, toxicokinetics, biochemical action of poisons, and environmental toxicology are studied. Acute and chronic effects of various classes of poisons (e.g., pesticides, drugs, metals, and industrial pollutants) are discussed in relation to typical routes of exposure and regulatory testing methods. *Prerequisite*: Organic Chemistry, one year of general biology, or consent of instructor.

EXECUTIVE LEADERSHIP AND ENTREPRENEURSHIP

E L E 301 Executive Leadership and Entrepreneurship I 3(2,3) Comprehensive, cross-disciplinary fundamentals of entrepreneurship and executive leadership. Team taught by faculty from various disciplines. *Prerequisite*: Sophomore standing, nomination and selection by faculty.

E L E (MKT) 314 New Venture Creation I 3(3,0) See MKT 314.

E L E (MGT) 315 New Venture Creation II 3(3,0) See MGT 315.

E L E (ECON) 321 Economics of Innovation 3(3,0) See ECON 321.

E L E (PO SC, PSYCH, SOC) 356 Social Science of Entrepreneurship 3(3,0) See SOC 356.

E L E 401 Executive Leadership and Entrepreneurship II 3(2,3) Continuation of E L E 301. Comprehensive, cross-disciplinary fundamentals of entrepreneurship and executive leadership. Case studies of business success and failures. *Prq:* E L E 301.

E L E 499 Executive Leadership and Entrepreneurship III 3-6(1-3,6-12) Continuation of E L E 301 and 401. Directed practical study of entrepreneurship and leadership. Students work closely with external infant firms to develop new products and bring existing products to market successfully. *Prq:* E L E 401.

EXPERIMENTAL STATISTICS

Professors: W. C. Bridges, Jr., L. W. Grimes, H. S. Hill, Jr., J. R. Rieck, J. E. Toler; *Lecturer:* R. Martinez-Dawson

EX ST 222 Statistics in Everyday Life 3(3,0) Focuses on the role of statistics in a variety of areas including politics, medicine, environmental issues, advertising, and sports. Students explore common statistical misconceptions and develop an understanding of how principles of probability and statistics affect many aspects of everyday life. Not open to students who have received credit for EX ST 301, MTHSC 301, 302, or 309.

EX ST 301, H301 Introductory Statistics 3(2,2) Basic concepts and methods of statistical inference; organization and presentation of data, elementary probability, measures of central tendency and variation, tests of significance, sampling, simple linear regression and correlation. The role of statistics in interpreting research and the general application of the methods are stressed. Credit toward a degree will be given for only one of EX ST 301, MTHSC 301, 302, 309.

EX ST 311 Introductory Statistics II 3(2,2) Introduction to simple linear and multiple regression, principles of experimental design, and analysis of data using parametric and nonparametric techniques. Analysis of data is conducted using SAS. Examples come primarily from agriculture, food, life and health sciences, forestry, and natural resources. Credit toward a degree will be given for only one of EX ST 311 or MGT 310. *Prq:* EX ST 301 or equivalent with a C or better.

EX ST 411, 611 Statistical Methods for Process Development and Control 3(3,0) Experimental design techniques for use in process development, application of screening experiments and response surface experiments, techniques for process control with implications for product quality control. Includes discussions of the use of statistical computer analyses and interpretations including computer generated graphics. *Prq:* MTHSC 206 or consent of instructor.

EX ST 462, 662 Statistics Applied to Economics 3(3,0) Continuation of EX ST 301 with emphasis on statistical methods used in the collection, analysis, presentation, and interpretation of economic data. Special attention is given to time series analysis, the construction of index numbers, and the designing of samples for surveys in the social science fields. *Prq:* EX ST 301.

FINANCE

Professors: J. C. Alexander, Jr., R. B. McElreath, Jr., *Chair:* M. E. Spivey, N. G. Waller; *Associate Professors:* J. M. Harris, Jr., R. H. Klein; *Assistant Professors:* D. J. Bradley, A. G. Morgan, J. G. Wolf; *Lecturer:* K. McMillan

FIN 301 Personal Finance 3(3,0) Analysis of the preparations of personal financial plans. Topics include savings and budgeting, personal taxes, housing and automobile decisions, loans, insurance needs, investments, and retirement needs. May not be counted toward a major or minor in Financial Management.

FIN 304 Risk and Insurance 3(3,0) Studies the nature of risk and the role of insurance in risk management from individual and business viewpoints. Topics include probability, theory of the firm under uncertainty, insurance carriers and contracts, underwriting, and regulation. *Prq:* FIN 306 or 311 or consent of instructor.

FIN 305 Investment Analysis 3(3,0) Study of techniques useful in analyzing alternative investment opportunities with emphasis on corporate securities. Investment planning and portfolio management are considered. *Prq:* FIN 306 or 311 with a C or better, or consent of instructor.

FIN 306 Corporation Finance 3(3,0) Introduction to financial management of nonfinancial firms. Includes such topics as analysis of financial statements, financial forecasting, capital budgeting, working capital management, and long-term financing decisions. Credit may not be received for both FIN 306 and 311. *Prq:* ACCT 201; MTHSC 203 or 301 or 309 or EX ST 301; or consent of instructor.

FIN 307 Principles of Real Estate 3(3,0) Acquaints students with the theories, practices, and principles which govern real estate markets. Major emphasis is on specifics of real estate brokerage, property rights, and ownership; making real estate investment decisions; and financing real estate investments. *Prq:* FIN 306 or 311 with a C or better, or consent of instructor.

FIN 308 Financial Institutions and Markets 3(3,0) Study of the various types of financial institutions and of topics critical to the financial institutions practitioner. Topics include financial regulations, financial security types and their yields, interest rate risk management, foreign currency risks management, and stock index futures. *Prq:* FIN 306 or 311 with a C or better, or consent of instructor.

FIN 311, H311 Financial Management I 3(3,0) First in a two-course sequence to provide in-depth exposure to the theory and practice of corporate financial management and to demonstrate how financial management techniques are applied in decision making. Credit may not be received for both FIN 306 and 311. *Prq:* ACCT 204 with a C or better, and MTHSC 301 or 309 or EX ST 301, or consent of instructor.

FIN 312, H312 Financial Management II 3(3,0) Continuation of the two-course sequence that begins with FIN 311. *Prq:* FIN 311 or 306 with a C or better and approval of Finance Department advisor.

FIN 399 Finance Internship 1-3(1-3,0) Pre-planned, preapproved, faculty-supervised internships to give students on-the-job learning in support of classroom education. Internships must be no less than six full-time, consecutive weeks with the same internship provider. Restricted to students with a major or minor in Financial Management. To be taken Pass/Fail only. *Prq:* Consent of instructor.

FIN 402, H402, 602 Advanced Corporate Finance 3(3,0) Study of the decision process and analytical techniques used in evaluating corporate investment and financing decisions. Topics include capital budgeting, real options, working capital management, mergers and acquisitions, bankruptcy and reorganization, and financial management in not-for-profit businesses. *Prq:* FIN 312 or consent of instructor.

FIN 404, H404 Financial Modeling 3(3,0) Helps students develop the practical skills that combine theory, business planning, and forecasting needed to make financial decisions. Emphasis is placed on the use of spreadsheet software used to set up and solve these models. Topics include financial statement analysis, valuation, and cost of capital. *Prq:* FIN 312; CP SC 220 or MGT 218, or consent of instructor.

FIN 405 Portfolio Management and Theory 3(3,0) Introduction to portfolio management. Includes the underlying theory, managing the equity and the fixed-income portfolios, portfolio evaluation, options-pricing theory, future markets and instruments. *Prq:* FIN 305 with a C or better or consent of instructor.

FIN 406, 606 Analysis and Use of Derivatives 3(3,0) Consideration of the option pricing theory and strategy techniques most commonly used in the market for options. An overview of the futures markets is also considered. Special emphasis is given to interest-rate futures, stock-index futures, and foreign-exchange futures. *Prq:* FIN 305 or consent of instructor.

FIN 408 Management of Financial Institutions 3(3,0) Detailed study of the operational, marketing, and regulatory aspects of the management of depository financial institutions. Emphasis is on decision making through the extensive use of cases. *Prq:* FIN 308.

FIN 409 Professional Financial Planning 3(3,0) Concepts and practical implementation of professional financial planning, with focus on essentials of budgeting and saving, risk management, tax planning, investment planning, and retirement and estate planning. Emphasis is on integrating these elements into a comprehensive personal financial plan. *Prq:* ACCT 404, 408, FIN 304, 305.

FIN 410, H410 Research in Finance 1-3 Directed research course for students interested in careers in finance. Research topic is selected by student and approved by instructor. A formal research paper is required. *Prq:* FIN 306 or 312, consent of instructor.

FIN 411 International Financial Management 3(3,0) Extension of the principles of finance to the international context. Focuses on implications of the existence of multiple currencies and the operations across borders of sovereign nation-states for the multinational corporation. *Preq:* FIN 312 or 306 with a C or better or consent of instructor.

FIN 415, 615 Real Estate Investment 3(3,0) Focuses on the structure and analysis of real estate investment emphasizing financial theory and analysis technique. Case study and project-oriented homework assignments facilitate the understanding of real estate investments. *Preq:* FIN 307 with a C or better or consent of instructor.

FIN 416, 616 Real Estate Valuation 3(3,0) Advanced course in commercial real estate valuation. Topics include income capitalization, cash equivalency, highest and best use analysis, the cost approach, the direct sales comparison approach, and DCF analysis. *Preq:* FIN 307 with a C or better or consent of instructor.

FIN 417, 617 Real Estate Finance 3(3,0) Advanced course applying financial analysis and theory to real estate. Mortgage credit analysis and current financing techniques for residential and commercial properties are emphasized. Topics include financial institutions, syndications, and construction financing. *Preq:* FIN 307 with a C or better or consent of instructor.

FOOD SCIENCE

Professors: J. C. Acton, F. H. Barron, P. L. Dawson, R. D. Galyean, M. E. Kunkel, J. U. McGregor, *Chair*; *Associate Professor:* V. J. Haley-Zitlin; *Assistant Professors:* F. Chen, M. D. Condrasky, X. Jiang; *Lecturer:* R. M. Haliena; *Adjunct Professor:* C. R. Barmore; *Adjunct Assistant Professor:* E. J. Rhodehamel; *Adjunct Instructors:* R. R. Perdue, K. G. Schwartz

FD SC 101 Epochs in Man's Struggle for Food 1(1,0) Study of significant developments in food preservation methods and the impact each has had on man's struggle for food.

FD SC 102 Perspectives in Food and Nutrition Sciences 2(2,0) Discussion course covering topics related to food science and human nutrition. Subjects include topics of current interest and involve familiarization with scientific literature in nutrition and food sciences.

FD SC 201 Man and His Food 2(2,0) Study of food and food products with emphasis on nutrients, nutrient needs, and the relationship between nutrient intake and health. Food additives, nutritional awareness (including nutrition labeling), food protection, and the influence of processing on nutritional quality of food are also discussed.

FD SC 214 Food Resources and Preservation 3(3,0) Introduces students to basic food chemistry, food microbiology, and food processing principles. Topics include the structure of food components, bacterial inactivation in food, and preservation principles.

FD SC 215 Culinary Fundamentals 1(0,3) Culinary skills development lab course with emphasis on safety and sanitation. Practical preparation, evaluation, and presentation of fruits/vegetables, grains, eggs, salads/cold sauces, stocks, sauces, soups, poultry, red meat, seafood, quick breads, yeast breads, bakery desserts, frozen confections, and ice cream. *Preq:* Food Science major or consent of instructor.

FD SC 250 Culinary Science Internship 0(0,99) Students experience the science and art of food preparation, with the ultimate object of improving the ease of manufacture, as well as the overall quality and nutrition of the food produced. Students are able to observe, interact, and practice principles of culinary sciences. To be taken Pass/Fail only. *Preq:* FD SC 215.

FD SC 306 Food Service Operations 3(3,0) Principles of management of resources in food service systems. Emphasizes menu planning, types of delivery systems, principles of quantity food production, techniques for cost control and concepts of food science and food safety. *Preq:* FD SC 214 or equivalent or consent of instructor. *Coreq:* FD SC 404, 407.

FD SC 307 Restaurant Food Service Management 3(3,0) Essentials of successful operation of restaurants including menu design and pricing, marketing, customer satisfaction, purchasing, kitchen operations, and employment relationships.

FD SC 350 Food Science Internship 0(0,99) Summer internship offered by Food Science and Human Nutrition Department and the Clemson MicroCreamery and Food Manufacturing Industries. Students are able to observe, interact, and practice principles of food science within the food industry. To be taken Pass/Fail only. *Preq:* FD SC 214 or consent of instructor.

FD SC 401, H401, 601 Food Chemistry I 4(3,3)F Even-numbered years. The basic composition, structure, and properties of food and the chemistry of changes occurring during processing utilization. *Preq:* BIOCH 305 or consent of instructor.

FD SC 402, H402, 602 Food Chemistry II 4(3,3)S Odd-numbered years. Application of theory and procedures for quantitative and qualitative analysis of food ingredients and food products. Methods for protein, moisture, lipid, carbohydrate, ash, fiber, rancidity, color, and vitamin analyses and tests for functional properties of ingredients are examined. *Preq:* BIOCH 305 or consent of instructor.

FD SC 404, 604 Food Preservation and Processing 3(3,0) Principles of food preservation applied to flow processes, ingredient functions, and importance of composition and physical characteristics of foods related to their processing; product recalls and product development concepts. *Preq:* Physics and organic chemistry or biochemistry.

FD SC 406, 606 Food Preservation and Processing Laboratory I 1(0,3) Laboratory exercises on preservation methods, equipment utilized, and processes followed in food manufacture. *Coreq:* FD SC 404.

FD SC 407, 607 Quantity Food Production 2(1,3) Principles of the production of food in quantity for use in food service systems. Emphasis is on functions of components of foods and of ingredients in food on the quality of the final product on safe production of food and on proper use of equipment. *Coreq:* FD SC 306, 404.

FD SC 408, 608 Food Process Engineering 4(3,3) Study of basic engineering principles and their application in food processing operations. The relation between engineering principles and fundamentals of food processing is emphasized. *Preq:* CH 102, FD SC 214, MTHSC 106, PHYS 207 or 200 or 122 or consent of instructor.

FD SC (PKGSC) 409 Total Quality Management for the Food and Packaging Industries 3(3,0) Introduction to the principles of modern quality management with emphasis on quality standards and issues and the practices necessary for food processing and packaging companies to survive in a customer-driven marketplace.

FD SC 417 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

FD SC 418 Seminar 1(1,0) Literature research and oral presentation of current food science topics.

FD SC 420, H420 Special Topics in Food Science 1-3(1-3,0) Special topics in food science not covered in other courses. May be repeated for a maximum of 12 credits, but only if different topics are covered. *Preq:* Consent of instructor.

FD SC 421, H421 Special Problems in Food Science 1-4(0,3-12) Independent research investigation in food science areas not conducted in other courses. May be repeated for a maximum of 12 credits. *Preq:* Consent of instructor.

FD SC 491 Practicum 1-4 Supervised experiential opportunities in the food industry. May be repeated for a maximum of 12 credits. *Preq:* Junior standing and consent of department chair.

FOREST AND RECREATION RESOURCES

F&RR (HIST) 392 History of the Environment of the United States 3(3,0) See HIST 392.

FOREST RESOURCE MANAGEMENT

Professors: W. H. Conner, D. C. Guynn, Jr., R. L. Hedden, P. A. Layton, *Chair*; A. W. Lee, A. P. Marsinko, L. E. Nix, T. J. Straka, D. H. Van Lear, T. E. Wooten, G. K. Yarrow; *Associate Professors:* J. D. Caldwell, W. R. English, L. R. Gering, J. D. Lanham, B. W. Pinkerton, V. B. Shelburne; *Assistant Professor:* G. G. Wang

FOR 101 Introduction to Forestry 1(1,0)F Informative sketch of forestry, forests, and forestry tasks of the nation; education and career opportunities for foresters.

FOR 102 Introduction to Forestry 1(1,0)S Continuation of FOR 101.

- FOR 205 Dendrology 3(2,3)**F Classification, nomenclature, and identification of the principal forest trees of the United States, their geographical distribution, ecological requirements, and economic importance. Field identification of native trees and commonly planted exotics in the Piedmont and surrounding areas. *Prq:* BIOL 103 or consent of instructor.
- FOR 206 Forestry Ecology 3(2,3)**S Study of the nature of forests and forest trees, how they grow, reproduce, and their relationships to the physical and biological environment. *Prq:* BIOL 103, CSENV 202, FOR 205 or consent of instructor.
- FOR (PRTM) 209 Professional Application of Microcomputers 3(1,4) [C,3]** See PRTM 209.
- FOR 221 Wood Properties I 3(2,3)**F Formation of wood in forest trees, gross and minute characteristics of wood, defects in wood, variability in wood. *Prq:* BIOL 103 or consent of instructor.
- FOR 227 Arboricultural Field Techniques 1(0,3)** Skills and techniques required to safely climb trees for tree maintenance. Emphasizes safety, proper equipment, and basic tree maintenance treatments. To be taken Pass/Fail only.
- FOR 251 Forest Communities 2(0,6)** Study of forest plant species and their successful status and habitat requirements with respect to landform, soil type, and other appropriate aspects of site classification. *Prq:* FOR 205 or consent of instructor.
- FOR 253 Forest Mensuration 4(0,12)** Introduction to measurements of land, individual trees, forest stands, forest products, and the application of mensurational techniques to the statistical and physical design of forest sampling methods, including measurement techniques of non-timber components of forest resources. *Prq:* FOR 205 or consent of instructor.
- FOR 254 Forest Products (Summer Camp) 1(0,3)** Tour of the forest products industry of South Carolina with an emphasis on those products and processes of some distinction or special interest. *Prq:* FOR 205 or consent of instructor.
- FOR 300 Christmas Tree Production 2(2,0)**F Theory and practice of establishing, managing, and marketing trees with an emphasis on Christmas tree production in the South. *Prq:* Consent of instructor.
- FOR 302 Forest Biometrics 3(2,3)**S Application of statistical methods to forestry problems including sampling theory and methods, growth measurements and prediction, and application of micro-computing to analysis of forestry data. *Prq:* FOR 253. *Coreq:* EX ST 301 or consent of instructor.
- FOR 304 Forest Resource Economics 3(3,0)**F Economic problems and principles involved in the utilization of forest resources and distribution of forest products, analysis of integrated forest operations. *Prq:* ECON 200 or consent of instructor.
- FOR 305 Woodland Management 3(2,2)**F S Compendium of forestry subjects providing a broad view of the forest environment as it relates to ecology, management, and utilization of forests, especially those of South Carolina. Field and laboratory exercises in the fundamentals of forest-land management. Not open to Forest Resource Management majors. *Prq:* BIOL 103 or consent of instructor.
- FOR 308 Remote Sensing and GIS in Forestry 2(1,3)**F Introduction to remote sensing, aerial photo interpretation, computer mapping, aerial photo timber estimating, and geographical information systems. *Prq:* Forestry summer camp or consent of instructor.
- FOR 314 Harvesting and Forest Products 4(3,3)** Harvesting of forest products, structure and properties of economically important timbers, and production and properties of primary forest products. *Prq:* Forestry summer camp or consent of instructor.
- FOR 315 Woodland Ecology 3(3,0)** Overview of the forest emphasizing the living and nonliving components of the woodland habitat. Understanding man's use of the forest and interpreting the signs of plants, wildlife, and landscapes.
- FOR 341 Wood Procurement Practices in the Forest Industry 3(3,0)** Study of wood raw material procurement practices currently employed by the forest products industry, including pulp, paper, and related areas. *Prq:* Consent of instructor.
- FOR 400, 600 Public Relations in Natural Resources 3(3,0)** Identifying relevant policies, their characteristics and acceptance to natural resource management and techniques of maintaining appropriate public relations. *Prq:* Senior standing.
- FOR 406 Forested Watershed Management 2(2,0)** Basic discussion of processes and measurement of water flow on forested watersheds. Forest land management is stressed to assure adequate water quantity and quality. Role of water in nutrient cycling and forest growth is also discussed. *Prq:* CSENV 202 and FOR 315, or consent of instructor.
- FOR 413, 613 Integrated Forest Pest Management 4(3,3)**F Nature and control of pests of forest trees and products. Focuses on the relation of pests to silviculture, management, and natural forest ecosystems. *Prq:* Junior standing in Forest Resource Management.
- FOR 415, 615 Forest Wildlife Management 3(2,3)** Principles, practices, and problems of wildlife management with emphasis on upland forest game species. Habitat manipulation through use of appropriate silvicultural practices in association with other techniques is evaluated. *Prq:* Consent of instructor.
- FOR (ENR) 416, 616 Forest Policy and Administration 2(2,0)** Introduction to the development, principles, and legal provisions of forest policy in the United States and an examination of administrative and executive management in forestry.
- FOR 417, 617 Forest Resource Management and Regulation 3(3,0)** Fundamental principles and analytical techniques in planning, management, and optimization of forest operations. *Prq:* FOR 302, 304, 308, and Forestry summer camp.
- FOR 418, 618 Forest Resource Valuation 3(3,0)** Analysis of capital investment tools and their application to decision making among forestry investment alternatives; valuation of land, timber, and other resources associated with forestry, including the impact of inflation and taxes. *Prq:* FOR 304 or consent of instructor.
- FOR 419 Senior Problems 1-3(1-3,0)** Problems chosen with faculty approval in selected areas of forestry. With department chair's approval, may be repeated once for credit. *Prq:* Senior standing.
- FOR 421, 621 Biology and Silviculture of Hardwood Forests 2(1,2)**F Study of silvics, growth, and development of major hardwood species of North America that relates these biological characteristics to the ecology, silviculture, and utilization of the hardwood forests of the eastern United States. *Prq:* FOR 205, 206 or consent of instructor.
- FOR 423, 623 Current Issues in Natural Resources 4(2,0)** Lectures in various fields of forestry delivered by selected representatives from forest industries, consultants, agencies, associations, and other forestry operations. Course will not be taught when enrollment is less than 15. To be taken Pass/Fail only. *Prq:* Junior standing or consent of instructor.
- FOR 425 Forest Resource Management Plans 2(1,3)** Development of multiple resource forest management plans. Economic and environmental impacts of implementing management plans. *Prq:* FOR 417 or consent of instructor.
- FOR 426, H426 Forest Resource Management Plans Seminar 1(1,0)** In-depth exploration of topics and problems presented in FOR 425. To earn honors credit, student must be enrolled in corequisite FOR 425 and earn a B or better in both courses. *Prq:* Senior standing, approval of Department of Forest Resources. *Coreq:* FOR 425.
- FOR (HORT) 427, 627 Urban Tree Care 3(3,0)** Principles, practices, and problems of protecting and maintaining trees in urban and recreational areas. Examines environmental and biological factors affecting trees in high-use areas, their management and cultural requirements, and the practices necessary for their protection and care as valuable assets in the landscape. *Prq:* Junior standing or consent of instructor.
- FOR 431, 631 Recreation Resource Planning in Forest Management 2(1,3)**S Odd-numbered years. Analysis of forest recreation as a component of multiple-use forest management; techniques of planning; physical and biological effects on forest environments; and forest site, user, and facility management.
- FOR 433, 633 GPS Applications 3(2,3)** Develops competence in global positioning system (GPS) technology including theory, methods, and application to natural resources mapping. Topics include basic concepts of GPS; projection systems; types of data; mission planning; and data capture, correction, and export to geographical information systems (GIS). *Prq:* Senior standing or consent of instructor.
- FOR 434, 634 Geographic Information Systems for Landscape Planning 3(2,3)** Develops competence in geographic information systems (GIS) technology and its application to various spatial analysis problems in landscape planning. Topics include data development and management, spatial analysis techniques, critical review of GIS applications, needs analysis and institutional context. GIS hardware and software, hands-on application. Credit may be received for only one of C R P (ENR) 434, FOR 434.
- FOR 441, 641 Properties of Wood Products 3(3,0)** Basic properties of wood, including the hygroscopic, thermal, electrical, mechanical, and chemical properties; standard testing procedures for wood. *Prq:* Junior standing or consent of instructor.

FOR 442, 642 Manufacture of Wood Products 3(3,0) Manufacture of lumber, plywood, poles, piles; drying, preservation, grading, and uses of wood products. Manufacture of particleboard, flakeboard, oriented-strand board, fiberboard, and paper products. Includes physical, mechanical, and chemical properties and their applications. *Preq:* Consent of instructor.

FOR 443, 643 Manufacture of Wood Products II 3(3,0) Manufacture of particleboard, flakeboard, oriented-strand board, fiberboard, and paper products. Includes their physical, mechanical, and chemical properties and their applications. *Preq:* FOR 221 or consent of instructor.

FOR 444, 644 Forest Products Marketing and International Trade 3(3,0) Study of marketing and international trade practices currently employed by the forest products industry and the application of basic marketing principles and global trade concepts in the industry's current and future environment. *Preq:* FOR 442 or 443 or consent of instructor.

FOR 447, 647 Selected Problems in Forest Products 1-3(0,3-9) Laboratory, library, or field study of problems in selected areas of forest products. Emphasis is on the planning and execution of research and the reporting of results. The research work must be conducted under the guidance of a Forest Products faculty. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Senior standing and consent of instructor supervising the study.

FOR 450 Woody Plant Stress Physiology 3(3,0) Structure, function, and physiology of tree shoot and crown growth, wood formation, diameter growth, root growth, and reproduction especially as related to stress factors. *Preq:* BIOSC 401 or FOR 460 or consent of instructor.

FOR (B, E, EE&S) 451, H451, 651 Newman Seminar and Lecture Series in Natural Resources Engineering 1(0,2) See B E 451.

FOR 460, 660 Silviculture I 3(2,3) Discussion of the theory and practice of establishing, maintaining, and harvesting forest stands in accordance with ecological and economic principles. *Preq:* FOR 206 and Forestry Summer Camp or consent of instructor.

FOR H461 Silviculture Honors Seminar I 1(1,0) In-depth exploration of topics and problems presented in FOR 460. To earn honors credits, students must be enrolled in FOR 460 and earn a B or better in both courses. *Preq:* Junior standing and approval of Department of Forest Resources. *Coreq:* FOR 460.

FOR 462, 662 Silviculture II 3(2,3) Discussion of forest management practices that affect ability of the land to produce multiple forest resources, with emphasis on water, nutrients, and fire. *Preq:* Consent of instructor.

FOR H463 Silviculture Honors Seminar II 1(1,0) In-depth exploration of topics and problems presented in FOR 462. To earn honors credit, students must be enrolled in FOR 462 and earn a B or better in both courses. *Preq:* Junior standing and approval of Department of Forest Resources. *Coreq:* FOR 462.

FOR 480 Selected Topics in Urban Forestry 1-3(1-3,0) Study of selected and varied topics, problems, and issues in urban forestry and arboriculture through readings, class discussion, and individual and group projects. *Preq:* FOR (HORT) 427.

FOR H491 Senior Honors Thesis I 3(3,0) Individual forestry research for students in the Forestry Honors program that focuses on developing a plan of research under the direction of a faculty advisory committee. *Preq:* Senior standing, participation in Honors Program, and approval of Department of Forest Resources.

FOR H492 Senior Honors Thesis II 3(3,0) Individual forestry research for students in the Forestry Honors program that focuses on data collection, analysis, report writing, and oral presentation. *Preq:* FOR H491.

FOR 493 Selected Topics in Forest Resources 1-15(1-15,2-30) Specialized topics not covered in other classes which explore current areas of research and management in forest resources in a format of lecture, lab, or both. May be repeated for a maximum of 15 credits, but only if different topics are covered. *Preq:* Junior standing or consent of instructor.

FRENCH

Professors: J. C. Bednar, D. J. Calvez, K. M. Szurlo; *Associate Professor:* D. Lepetit; *Assistant Professor:* C. B. Cephas; *Instructor:* R. R. Willingham; *Lecturers:* B. M. Ginstet-Levine, M. Kirsch

FR 101 Elementary French 4(3,1) Multimedia course for beginners that combines video, audio, and print to teach the fundamentals of the French language and culture. Emphasis is on communicative proficiency (listening comprehension and speaking, reading, and writing).

FR 102 Elementary French 4(3,1) Continuation of FR 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

FR 151 French for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in French. A minimum grade of B on a final examination will satisfy graduate school foreign language requirement. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* Graduate standing.

FR 201, H201 Intermediate French 3(3,1) Brief review of FR 101 and 102, with conversation, composition, and dictation, and the beginning of more serious reading of French prose. Includes literary and cultural perspectives. *Preq:* FR 102.

FR 202, H202 Intermediate French 3(3,1) Emphasis is on reading nontechnical French prose more rapidly. Writing, speaking, and listening skills continue to be developed. Includes literary and cultural perspectives. *Preq:* FR 201.

FR 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a maximum of three credit hours. *Preq:* Consent of instructor directing the play.

FR 300 Survey of French Literature 3(3,0) Study of selected masterpieces of French literature in their artistic, cultural, and historical context. May include theme and genre studies. *Preq:* FR 202 or consent of department chair.

FR 305 Intermediate French Conversation and Composition I 3(3,0) Practice in the spoken language, with stress on vocabulary building, pronunciation, intonation, and comprehension; written work to increase accuracy; assignments in the language laboratory. *Preq:* FR 202 or consent of department chair.

FR 307 French Civilization 3(3,0) Study of significant aspects of French culture from its origins to the present. *Preq:* FR 202 or consent of department chair.

FR 309 French Linguistics 3(3,0) Study of the fundamental structures of the French language: phonetics, syntax, and semantics. *Preq:* FR 202 or consent of department chair.

FR 312 Writing in French I 3(3,0) Study of the vocabulary, syntax, and stylistics in short compositions and creative papers in French, on both fiction and non-fiction topics. *Preq:* FR 202 or consent of department chair.

FR 316 French for International Trade I 3(3,0) Spoken and written French common to the French-speaking world of business and industry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analyses of American and French cultural patterns in a business setting. *Preq:* FR 202, 305 (or concurrent enrollment); or consent of department chair.

FR 317 Contemporary French Civilization 3(3,0) Study of significant aspects of France today; the country, its economy, government, society. Taught in French. *Preq:* FR 202 or consent of department chair.

FR 320 Studies in French Theatre 3(3,0) Explores a variety of genres (medieval farce, classical comedy and tragedy, romantic melodrama, and the Nouveau Théâtre) with emphasis on staging. Class materials consist of scripts, videotaped performances, and theoretical readings on issues pertaining to spectacle in social, political, and artistic terms. May be repeated for a maximum of six credits. *Preq:* FR 202 or consent of department chair.

FR (PO SC) 383 French Foreign Language News 1(1,0) See PO SC 383.

FR H391 Survey of French Literature (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on a topic relating to the literary, cultural, and artistic movement in France. *Coreq:* FR 300, membership in Calhoun Honors College Program.

FR 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

FR 400 Modern French Literature 3(3,0) Study of selected works of 20th-century French literature in their artistic, cultural, and historical context. *Preq:* FR 202 or consent of department chair.

FR 409 Writing in French II 3(3,0) Intensive study of syntax and stylistics through composition and translations. *Prq:* Senior standing or consent of department chair.

FR 410 Francophone Literature 3(3,0) Study of selected works of francophone literature, with an emphasis on Africa and the Caribbean, in their artistic, cultural, historical, and political contexts. *Prq:* FR 300 or consent of department chair.

FR 411 Advanced French Conversation and Composition 3(3,0) Continuation of FR 305, with emphasis on greater fluency and sophistication in oral and written expression. *Prq:* FR 305 or consent of instructor.

FR 412 French and Francophone Cinema 3(2,3) Examination of cinematic practice as a discourse and the role it plays in the representation of social relations, particularly race, ethnicity, class, power, sex, and gender in the French-speaking world. May include a study of major directors, genres, and movements. Taught in French. Films with English subtitles. *Prq:* Sophomore standing or consent of department chair.

FR 415 Translation Seminar 3(3,0) Methods and theory of translation and a comparison of French and English structures. Practical exercises in translating from French to English and vice versa in a variety of texts. *Prq:* FR 202 or consent of department chair.

FR 416 French for International Trade II 3(3,0) Study of language and cultural environment of the French-speaking markets of the world, including the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Prq:* FR 316.

FR 417 The French Corporation 3(3,0) Examination of the organization, structure, functioning, and economic role of the French business enterprise. *Prq:* FR 316 or consent of department chair.

FR 420 French Enlightenment, Revolution and Romanticism 3(3,0) Cultural and literary studies of the century and a half (1715 to 1851) in which France occupied the center stage of world history and its modern institutions came into being. Emphasis is on the free intellectual inquiry championed by philosophers and the romantic melancholy in the aftermath of the Revolution. *Prq:* FR 202 or consent of department chair.

FR H438 French Honors Research 3(3,0) Individual honors research conducted under direction of the Language Department faculty. May not be used to satisfy requirements for the major in Modern Languages—French or Language and International Trade or the minor in Modern Languages. *Prq:* Junior standing and membership in Calhoun Honors College Program.

FR H439 French Honors Thesis 3(3,0) Individual honors research conducted and thesis completed under direction of Language Department faculty member. May not be used to satisfy requirements for the major in Modern Languages—French or Language and International Trade or the minor in Modern Languages. *Prq:* Junior standing, FR H438, membership in Calhoun Honors College Program.

FR H491 Modern French Literature (Honors) 1(1,0) Independent study to allow honors students to pursue in depth an author, work, movement, or genre related to contemporary French culture, art, or literature. *Coreq:* FR 400, membership in Calhoun Honors College Program.

FR H492 The French Corporation (Honors) 1(1,0) Independent study to allow honors students to pursue an in-depth study of the organization, structure, functions, and economic role of a French business enterprise. *Coreq:* FR 417, membership in Calhoun Honors College Program.

FR 498 Independent Study 1-3(1-3,0) Directed study of selected topics in French literature, language, and culture. May be repeated for a maximum of six credits. *Prq:* Consent of department chair.

FR 499, 699 Selected Topics in French Literature 3(3,0) Selected topics that have characterized French literature, language, and culture. May be repeated for a maximum of six credits. *Prq:* Consent of department chair.

GENETICS

Professors: A. G. Albott, R. H. Hildeman, *Chair*; G. L. Powell, W. M. Surver, *Associate Professor*; W. R. Marcotte, Jr., *Assistant Professors*; W. Cao, F. C. Chen, J. K. Frugoli, D. S. Main, B. D. Moore, J. C. Morris, K. S. Smith, S. A. Sparace, J. P. Tomkins

GEN 300 Fundamental Genetics 3(3,0) Introductory course covering fundamental principles of genetics in prokaryotes and eukaryotes. Emphasis is given to Mendelian genetics, physical and chemical basis of heredity, and population genetics. *Prq:* BIOL 104 or consent of instructor.

GEN 302, H302 Molecular and General Genetics 3(3,0) Rapidly-paced course covering Mendelian and molecular genetics, with introductory coverage of quantitative and population genetics. Emphasis is on the molecular basis of heredity and gene expression in prokaryotes and eukaryotes and modern genetic technology. *Prq:* BIOL 111 or consent of the instructor.

GEN 303 Introductory Genetics Laboratory 1(0,3) Laboratory exercises introducing fundamental principles of inheritance in prokaryotes and eukaryotes. *Prq:* GEN 302 or concurrent enrollment.

GEN (BIOSC) 405, H405, 605 Molecular Genetics of Eukaryotes 3(3,0) Molecular genetic analyses of eukaryotes in relation to mutations and repair, complex phenotypes, biochemical pathways, short- and long-term regulation of gene expression, and evolution. *Prq:* GEN 302 or equivalent and one semester of biochemistry, or consent of instructor.

GEN 410, H410, 610 Fundamentals of Genetics I 3(3,0) First in a two-semester sequence in genetics covering Mendelian genetics, topics in cytogenetics, extranuclear inheritance, quantitative, evolutionary, conservation, and population genetics. *Prq:* CP SC 102 (or equivalent), EX ST 301, GEN 302, or consent of instructor.

GEN 411 Fundamentals of Genetics I Laboratory 1(0,3) Crosses are carried out using eukaryotic organisms (C. elegans, Drosophila, yeast) with appropriate markers to follow inheritance. Population and evolutionary genetics concepts are also examined. *Prq:* GEN 410 or concurrent enrollment.

GEN (BIOSC) 416, 616 Recombinant DNA 3(3,0) Familiarizes students with the most current facts and concepts of molecular genetics. Lectures focus on gene organization, structure, and expression in prokaryotes and eukaryotes, highlighting current technologies and research in these areas. *Prq:* GEN 302 or equivalent and one semester of biochemistry or consent of instructor. A developmental biology course is also strongly recommended.

GEN (BIOSC, MICRO) 418, 618 Biotechnology I: Nucleic Acids Techniques 4(2,4) Basic training in the manipulation of genetic information using recombinant DNA technology. Includes techniques in molecular cloning, Southern and Northern analyses, clone library construction. *Prq:* BIOCH 301 or 305, MICRO 305 or consent of instructor.

GEN 420, H420, 620 Fundamentals of Genetics II 3(3,0) Second in a two-semester sequence in genetics covering molecular genetics, gene expression, recombinant DNA technology, genomics, bioinformatics, proteomics, developmental, human, cancer, and behavioral genetics. *Prq:* GEN 410 or consent of instructor.

GEN 421 Fundamentals of Genetics II Laboratory 1(0,3) Molecular genetics is emphasized using prokaryotic organisms (lambda or T4 phage, E. coli, B. subtilis) and yeast. Slime molds are used to model developmental processes. Bioinformatic methods are integrated into laboratory exercises by employing simulations illustrating genetic principles underlying human behavior and cancer biology. *Prq:* GEN 420 or concurrent enrollment.

GEN 440, H440, 640 Bioinformatics 3(3,0) Theory and application of computational technology to analysis of the genome, transcriptome, and proteome. *Prq:* CP SC (or equivalent), GEN 302, 410, or consent of instructor.

GEN 450, H450, 650 Comparative Genetics 3(3,0) Outlines the genome structure, function, and evolution based on available complete genome sequences. Topics include the evolution of multigene families, origin of eukaryotic organelles, molecular phylogeny, gene duplication, domain shuffling, transposition, and horizontal gene transfer. *Prq:* GEN 420, 440 or consent of instructor.

GEN (BIOSC, HORT) 465, 665 Plant Molecular Biology 3(3,0) See HORT 465.

GEN 470, 670 Human Genetics 3(3,0) Basic principles of inheritance; population, molecular and biochemical genetics; cytogenetics; immunogenetics; complex traits; cancer genetics; treatment of genetic disorders; genetic screening and counseling; and the Human Genome Project. *Prq:* GEN 302 or consent of instructor.

GEN 491, H491 Special Problems in Genetics 1-8(0,3-24) Orientation in genetic research (i.e. experimental planning, execution, and reporting). May be repeated for a maximum of eight credits. *Prq:* GEN 410, 411, 420, 421 or consent of instructor.

GEN (BIOCH) 493, H493 Senior Seminar 2(2,0) See BIOCH 493.

GEN (ENT) 495, 695 Insect Biotechnology 3(3,0) See ENT 495.

GEOGRAPHY

Associate Professor: J. A. Miller; *Assistant Professor:* C. A. Smith; *Lecturer:* L. E. Howard

GEOG 101 Introduction to Geography 3(3,0) Survey of the nature of geography, with emphasis on the discipline's organizing themes of earth science, relations between people and their environments, interrelations between places, locational analysis, and area studies.

GEOG 103 World Regional Geography 3(3,0) Systematic and descriptive survey of the major regions of the world, including their physical and cultural features. Provides a global context for courses in the social sciences and humanities.

GEOG 106 Geography of the Physical Environment 4(3,3) Examines the condition of the physical environment, especially the earth's surface and the processes that act on it. Topics range from earth-sun relations to the evolution of landscapes; human habitats and human alteration of the environment.

GEOG 301 Political Geography 3(3,0) Geographic basis of states: sovereignty, territory, power within states, relations between states. The geography of international affairs. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 302 Economic Geography 3(3,0) Spatial analysis of economic activity, with an emphasis on regional economies and development. Topics include world population; technology and economic development; principles of spatial interaction; and geography of agriculture, energy manufacturing, and tertiary activities. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 303 Urban Geography 3(3,0) Historical and contemporary survey of the urban world, with particular attention paid to the relationship between people and urban places. Topics include the rise of cities, urban hierarchies, urban land use, and the social geography of cities. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 305 Cultural Geography 3(3,0) Broad examination of the basic cultural variables in the human occupation of the earth. Ecological, spatial, regional, and historical approaches; topics vary but may include cultural areas and distributions, cultural change, cultural landscape, and cultural ecology. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 306 Historical Geography 3(3,0) Exploration of geographical change and the varied patterns of past human activities and people's relationships with the physical environment. Case studies from around the world are used to emphasize key themes in historical geography. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 330 Geography of the Middle East and North Africa 3(3,0) Thematic survey of a world region extending from Morocco to Afghanistan. Emphasis is on climate, environment, social geography, historical development of the regional culture of Islam, and common problems facing the area today. *Preq:* GEOG 101 or 103, or consent of instructor.

GEOG 340 Geography of Latin America 3(3,0) Introduction to the physical, economic, political, and human/cultural geography of Latin America. Special focus on regional unity and diversity and the historical interaction of man and environment.

GEOG 360 Geography of Africa 3(3,0) Study of how tropical, or sub-Saharan, Africa functions in the modern world. Africa's physical environments, peoples and cultures, colonial and post-colonial history, and ideologies of economic development. Five basic themes are covered: population, natural resources, environmental quality, political organization, economic development. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 401, 601 Studies in Geography 3(3,0) Intensive study of the geography of a selected world region, such as North America, Europe, or the Middle East, or the geography of a topic, such as the geography of oil or the geography of underdevelopment. May be repeated once for credit with departmental consent. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 410, 610 Geography of the American South 3(3,0) Study of the geography of the American South in its changing complexities across almost 400 years of development. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 420, 620 Historical Geography of the United States 3(3,0) Survey that places the spatial concepts of geography into a time sequence with special emphasis upon the United States. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG (PRTM) 430, 630 World Geography of Parks and Equivalent Reserves 3(3,0) See PRTM 430.

GEOG 440, 640 Geography of Historic Preservation 3(3,0) Aspects of historic preservation with emphasis on sites and structures in their geographical, historical, and socio-economic contexts. Examples are drawn from American architectural styles and settlement forms. *Preq:* GEOG 101 or 103 or consent of instructor.

GEOG 499 Independent Study in Geography 3(3,0) Study of selected topics in geography under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration.

GEOLOGY

Professors: A. W. Elzerman, *Director*; R. W. Falta, Jr., E. J. Molt, J. R. Wagner, R. D. Warner; *Associate Professors:* J. W. Castle, R. A. Christopher, C. M. Lee, L. C. Murdoch; *Assistant Professors:* S. E. Brame, *Research Associate:* E. R. Carraway, M. A. Schlauman, P. M. Reppert; *Lecturer:* L. B. Krause

GEOG 100 Current Topics in Geology 11(1,0) Lectures and demonstrations covering topics of current interest in the different fields of geology. Recent research developments and career opportunities in the geosciences are emphasized.

GEOG 101, H101 Physical Geology 3(3,0) Study of the minerals and rocks which compose the earth's crust, their origins and transformations. Emphasizes geological processes, both internal and external, by which changes are produced on or in the earth.

GEOG 102 Historical Geology 4(3,3) Survey of the earth's geologic history emphasizing how the continents and ocean basins have evolved through geologic time. Evolution of life from the beginning of the fossil record through the present; identification of fossil plants and animals and interpretation of earth's past through study of geologic maps. Field trips illustrate principles. *Preq:* GEOG 101, 103.

GEOG 103, H103 Physical Geology Laboratory 1(0,2) Laboratory to accompany GEOG 101. Instruction is provided in the identification of minerals and rocks and in the interpretation of geologic processes through study of topographic maps. Field trips provide direct observation of processes and results. *Coreq:* GEOG 101.

GEOG 112 Earth Resources 3(3,0) Survey of earth's mineral, energy, water, and land resources and environmental and societal impacts associated with the use of these resources. *Preq:* GEOG 101.

GEOG 114 Earth Resources Laboratory 1(0,2) Laboratory to accompany GEOG 112. Instruction is provided in the identification of ore and gem minerals and of other earth materials of economic importance. Land and water resources are explored through the use of topographic maps, aerial photographs, remotely sensed images, and field trips. *Preq:* GEOG 103. *Coreq:* GEOG 112.

GEOG 210 Geology of the National Parks 3(3,0) Survey of selected national parks and monuments emphasizing the dynamic geological processes which have shaped the landscapes of these areas. Special attention is focused on parks exhibiting recent geological activity related to volcanoes, earthquakes, and glaciers. Slides and films are used to highlight specific geologic features.

GEOG (ASTR) 220 Planetary Science 3(3,0) Survey of the formation and evolution of planetary bodies. Emphasis is on the origin of planetary material and comparative study of the primary processes operative on planetary surfaces. Major features of the planets and moons in our solar system, as revealed by recent space missions, are described.

GEOG 300, H300 Environmental Geology 3(3,0) Discussion-oriented introductory study of the relationships of man to his physical surroundings and problems resulting from upsetting the established equilibria of geologic systems; man's role as a geologic agent, environmental conservation and management. *Preq:* GEOG 101 or consent of instructor.

GEOG 302, H302 Structural Geology 4(3,3) Diverse geological structures of the earth, their description, origin, and field recognition. Practical problems in interpreting geologic structures are utilized, in addition to theoretical considerations of the mechanics and causes of tectonism. *Preq:* GEOG 102 or consent of instructor.

GEOG 306 Mineralogy 4(3,3) Introduction to fundamental concepts of crystallography, crystal chemistry, and mineral optics. Topics include crystal symmetry, principles of crystal structures, composition and stability of minerals, and optical properties. Laboratory exercises emphasize recognition of crystallographic features, identification of minerals from their physical properties, and introduction to study of minerals with polarizing microscope. *Preq:* GEOG 101, 103 or consent of instructor.

GEOL 310 Optical Mineralogy 3(1,5) Involves techniques of mineral identification with polarizing microscope. Criteria are provided for the determination of optical properties using oil immersion grain mounts. Students are also introduced to the study of minerals and rocks in thin section. Lecture topics explore mineral optics theory. *Preq:* GEOL 306.

GEOL 314 Sedimentary Petrology 3(2,3) Origin, composition, and texture of sediments and sedimentary rocks, including both siliclastic and chemical varieties. Interpretation of tectonic settings, depositional systems, facies relationships, and diagenesis. Laboratory involves description and classification of hand specimens and thin sections and analytical methods. *Preq:* GEOL 306 or consent of instructor.

GEOL 316, H316 Igneous and Metamorphic Petrology 3(2,3) Classification, occurrence, and origin of igneous and metamorphic rocks. Discussion of the chemical and physical processes involved in magmatic crystallization and metamorphism. Laboratory study of igneous and metamorphic rocks in hand specimen and thin section. Not open to students who have received credit for GEOL 309. *Preq:* GEOL 306, 310 or consent of instructor.

GEOL 318 Introduction to Geochemistry 3(3,0) Introduction to distribution of elements in the core, mantle, and crust of the earth. Control of rock type on trace element content in soils and sediments. Weathering; soil and regolith formation; water-sediment interrelations; solubility, mobility and bioavailability in relation to redox, pH and complexation; biogeochemical cycles of selected elements. *Preq:* GEOL 101 and CH 102 or consent of instructor.

GEOL 320, H320 Engineering Geology 3(3,0) Application of engineering principles to geologic problems. Identification of important material properties and mechanics of earth materials. Techniques of geologic site evaluation with emphasis on civil works and construction projects. *Preq:* GEOL 101, 103, MTHSC 108, PHYS 122.

GEOL 375 Bahamian Field Study 3(1,4) Relationships among marine sediment types, physical processes, and biological activity are observed. The world's third largest barrier reef is examined. Students stay one week at a field station on Andros Island in the Bahamas and travel by van and boat to various sites. Additional fees are required. *Preq:* GEOL 101 or consent of instructor.

GEOL 401, 601 Applied Geophysics 3(2,2) Introduction to the most important methods of geophysical exploration and their application to the investigation of subsurface groundwater and mineral resources. Emphasis is on the principles, techniques, interpretations and limitations of magnetic, gravimetric, electrical, electromagnetic, well-logging, and seismic geophysical surveys. *Preq:* GEOL 101 or consent of instructor; PHYS 208 or 221 recommended.

GEOL 403, 603 Invertebrate Paleontology 3(2,3) Study of life of past geologic ages as shown by fossilized remains of ancient animals, with emphasis on the invertebrates. *Preq:* GEOL 101 or consent of instructor.

GEOL 405, 605 Geomorphology 3(2,3) Study of the surface features of the earth—their form, nature, origin, development, and rates and patterns of changes they are undergoing. Laboratory studies emphasize a process approach to terrain analysis stressing complex interactions of geologic, climatic, and tectonic forces. *Preq:* GEOL 101, 102, or consent of instructor.

GEOL 408, 608 Hydrogeology 3(3,0) Study of the hydrologic cycle, aquifer characteristics, theory of groundwater movement, mechanics of well flow, experimental methods, and subsurface mapping. *Preq:* GEOL 101, 102.

GEOL 411, H411 Research Problems 1-3(0,3-9) Field, laboratory, or library study of an approved topic in geology. Topic would be one not normally covered in formal courses, but may be an extension of a course. Taught either semester. May be repeated for a maximum of six credits. *Preq:* Senior standing or consent of instructor.

GEOL 413, 613 Stratigraphy 3(2,2) Analysis of stratified rocks as the repository of earth history and the conceptual framework used to synthesize the world geologic record as a coherent whole. Emphasis is placed not only on traditional lithostratigraphy but also on modern seismic stratigraphy, biostratigraphy, magnetostratigraphy, and current stratigraphic issues. *Preq:* GEOL 314 or consent of instructor.

GEOL 415 Analysis of Geological Processes 3(3,0) Introduction to methods for analyzing geological processes. Mathematical methods are introduced to solve problems related to stream flow, reaction kinetics, radioactive decay, heat flow, diffusion, fluid flow through geologic media and related processes. *Preq/Conreq:* MTHSC 206 or consent of instructor.

GEOL 421, 621 GIS Applications in Geology 3(1,4) Introduction to geographic information systems with applications to current geological and hydrological problems. Topics include the use of global positioning systems, spatial analysis, and image analysis. Hands-on training with geographic information systems software and techniques is covered in lab. *Preq:* Senior standing, strong computer skills.

GEOL 451, 651 Selected Topics in Hydrogeology 1-4(1-3,0-3) Selected topics in hydrogeology, with emphasis on new developments in the field. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* GEOL 300 or 408, or consent of instructor.

GEOL 475 Summer Geology Field Camp 6(4,6) Introduction to field techniques emphasizing methods applied to hydrogeology. Description and mapping of hydrogeologic units and structures using outcrop data and lithologic and geophysical well logs. Construction of potentiometric maps from water level data. Performance of pumping tests on mapped aquifers and analysis of data to determine aquifer characteristics. *Preq:* GEOL 302 and 306, or consent of instructor.

GERMAN

Professors: J. M. Melton, II M. Riley, M. M. Sunkel
Assistant Professors: G. J. Love, J. Schmidt, *Lecturer:* L. J. Ferrell

GER 101 Elementary German 4(3,1) Course for beginners in which, through conversation, composition, and dictation, the fundamentals of the language are taught and a foundation is provided for further study and the eventual ability to read and speak the language. Three hours a week of classroom instruction and one hour a week in the language laboratory.

GER 102 Elementary German 4(3,1) Continuation of GER 101; three hours a week of classroom instruction and one hour a week in the language laboratory.

GER 151 German for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in German. A minimum grade of B on a final examination will satisfy graduate school foreign language requirement. May be repeated once for credit. To be taken Pass/Fail only. *Preq:* Graduate standing.

GER 201, H201 Intermediate German 3(3,1) Brief review of GER 101 and 102, with conversation, composition, and dictation, and the reading of more serious German prose in short stories and plays. Includes literary and cultural perspectives. *Preq:* GER 102.

GER 202, H202 Intermediate German 3(3,1) Emphasis on reading nontechnical German prose more rapidly. Writing, speaking, and listening skills continue to be developed. Includes literary and cultural perspectives. *Preq:* GER 201 or consent of instructor.

GER 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a maximum of three credits. *Preq:* Consent of instructor directing the play.

GER 301 Twentieth-Century German Drama 3(3,0) Selected works from major German-speaking dramatists of the 20th century, including Brecht, Dürrenmatt, and Frisch. Required of German majors. *Preq:* GER 202 or consent of department chair.

GER 302 Twentieth-Century German Prose and Poetry 3(3,0) Selected prose and poetry from major 20th century German-speaking authors, including Rilke, Mann, Hesse, Kafka, and Böll. Required of German majors. *Preq:* GER 202 or consent of department chair.

GER 305 Intermediate German Conversation and Composition 3(3,0) Practice in the spoken language, with emphasis on vocabulary, pronunciation, and comprehension; written exercises for accuracy. Required of German majors. *Preq:* GER 202 or consent of department chair.

GER 308 German Civilization 3(3,0) Study of significant aspects of the culture of the German-speaking peoples from their origins to 1945. *Preq:* GER 202 or consent of department chair.

GER 309 Modern German Culture 3(3,0) Study of modern German culture from 1945 to the present with particular emphasis on the Federal Republic of Germany and significant aspects pertaining to the German Democratic Republic. *Preq:* GER 202 or consent of department chair.

GER 310 Summer Immersion Program 6(6,0) Conducted entirely in German for eight hours daily. Program consists of activities that combine interrelating cultural topics with language skill practice. Frequent opportunities to converse with native speakers during meals and on excursions. Students receive six credits, three of which may be taken in lieu of 202. *Preq:* GER 201.

GER 316 German for International Trade I 3(3,0) Spoken and written German common to the German-speaking world of business and industry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and German cultural patterns in a business setting. *Preq:* GER 251 or 202 and 305 (or concurrent enrollment); or consent of department chair.

GER 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in German literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

GER 400 Goethe and His Age 3(3,0) Study of the most significant period of German literature, with readings from works by Goethe, Schiller, and the Romantics. Supplementary materials may include audio visuals and documents on the music, art, and science of the period. Recommended for German majors. *Preq:* GER 301, 302, or consent of department chair.

GER 401 Studies in German Literature I 3(3,0) Selected topics in German literature from the beginning to 1832. *Preq:* GER 301, 302, or consent of department chair.

GER 402 Studies in German Literature II 3(3,0) Study of selected topics in 19th or 20th century German literature. *Preq:* GER 301, 302, or consent of department chair.

GER 403 Studies in German Literature III 3(3,0) Study of a major theme in German literature within a chosen time period or in the work of one major author. Themes may be subject- or genre-oriented. *Preq:* GER 301, 302, or consent of department chair.

GER 411 Studies in the German Language I 3(3,0) Advanced training in the spoken and written language with emphasis on vocabulary, syntax, and stylistics. *Preq:* GER 305 or consent of department chair.

GER 412 Studies in the German Language II 3(3,0) In-depth study of terminology and syntax for specific subject areas in business, in the liberal arts, and in the sciences. *Preq:* GER 301, 302, 305, or consent of department chair.

GER 413 Studies in German Culture 3(3,0) Intensive study of selected topics concerning cultural phenomena of the German-speaking nations. *Preq:* GER 301, 302, 305, or consent of department chair.

GER 416 German for International Trade II 3(3,0) Study of language and cultural environment of the German-speaking markets of the world, including linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* GER 316.

GER 417 German for International Trade III 3(3,0) Examination of the cultural and economic aspects of reconstructing eastern Germany's economy since the 1990 German unification. *Preq:* One German course at the 300 level or consent of department chair.

GER 498, 698 Independent Study 1-3(1-3,0) Supervised study of selected topics in German literature, language, or culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

GRAPHIC COMMUNICATIONS

Professors: S. T. Ingram, Chair; J. M. Leininger; *Associate Professors:* J. B. Simmons, R. M. Snyder; *Assistant Professors:* E. M. Weisenmiller, N. L. Woolbright; *Instructors:* E. D. Gilbert, G. R. Oliver; *Lecturers:* R. M. Carter, K. T. Cox, C. D. Jones, N. W. Leininger, L. H. O'Hara, K. K. Osborne, P. G. Rose; *Visiting Professors:* J. P. Crouch, F. T. Simon, W. E. West; *Adjunct Professor:* S. Edlein; *Adjunct Associate Professor:* L. W. Evans; *Visiting Lecturer:* S. Edlein; *Adjunct Lecturer:* C. Porcher

G C 101 Orientation to Graphic Communications 1(1,0) Introduction to the curriculum and the industry including its processes, products, and careers. Emphasis is placed on the attributes which are most desirable for successful entry and advancement up a variety of career ladders.

G C 104, H104 Graphic Communications I 4(2,6) Emphasis on basic graphic arts industrial concepts, principles, and practices, with laboratory applications in photography, layout and design, conventional and electronic copy preparation, reproduction photography, offset lithography, screen printing, and finishing operations. Flexography, gravure, letterpress and specialty printing processes are also covered, along with environmental, health, and safety concerns.

G C 207, H207 Graphic Communications II 3(1,6) Continuation of G C 104. Intermediate course for graphic communications and graphic arts specialists which broadens skills and technical knowledge in areas of layout, copy preparation, reproduction photography, film assembly, screen printing, lithographic presswork, and finishing. *Preq:* G C 101, 104, typewriter/computer keyboarding skills of 20 net words per minute.

G C 215, H215 Photographic and Digital Imaging Techniques 3(1,6) Emphasizes application of black and white and color imaging by photographic and digital technologies. Laboratory experiences assure confidence in the use of photographic and digital techniques for creating and enhancing original images for graphic reproduction and distribution.

G C 245 Graphic Communications Mechanical Systems 3(2,3) Concepts in mechanical systems and their controls as related to equipment and facilities in graphic communications industrial manufacturing. G C 207 and THRD 180 or consent of instructor.

G C 310, H310 Alternative Approaches to Imaging 4(2,6) Promotes the refining of skills learned in G C 104 and 207, with an in-depth study and application of computerized pre-press systems and methodologies. Serves as a transition course to the advanced graphic classes teaching offset lithography, flexography, screen printing, and gravure. *Preq:* G C 207, 215, or consent of instructor.

G C 350 Graphic Communications Internship I 1(0,3) Full-time supervised employment in an industrial in-plant setting for expansion of experience with materials and processes, production people, and organizations. *Preq:* G C 104 or equivalent, consent of instructor. *Coreq:* CO-OP 101.

G C 405, H405, 605 Package and Specialty Printing 2(2,0) Problems and processes for printing and converting in package, label, and specialty printing industries. Flexographic preparation, printing, die making, diecutting, transfer printing, screen container printing, pad printing, and bar code production are covered. New developments and trends are discussed. To be taken concurrently with G C 406. *Preq:* G C 245, 310, 350; or consent of instructor.

G C 406, H406, 606 Package and Specialty Printing Laboratory 2(0,6) Laboratory in techniques for printing and converting in package, label, and specialty printing industries. Experiences in flexographic prepress; printing; die design, die making and diecutting for label, folding cartons and corrugated; and glass, plastic, and metal container printing. *Preq:* G C 245, 310, 350; concurrent enrollment in G C 405; or consent of instructor.

G C 407, 607 Advanced Flexographic Methods 4(2,6) In-depth study of the methods used in flexographic printing and converting of porous and nonporous substrates. Theory and laboratory applications include setting standards for process color, preparation of plate systems, ink mixing and color matching, testing of films and foils, analysis of recent developments, and prediction of future markets. *Preq:* G C 406 or consent of instructor.

G C 440, H440, 640 Commercial Printing 5(2,9) Advances skills learned in previous graphic communications courses and applies the knowledge to large format presses. Students work from the design conception stage through all aspects of preparation, production, and finishing. Emphasis is placed on understanding and incorporating emerging technologies into the production work-flow. *Preq:* G C 310 and 350 or consent of instructor.

G C 444, H444, 644 Current Developments and Trends in Graphic Communications 4(2,6) Advanced course for Graphic Communications majors. Emphasis is on the theory and technical developments that affect process and equipment selection. Topics include color theory and application, electronic color scanning, electronic prepress and communications, gravure color quality control and analysis. *Preq:* G C 405, 406, 440.

G C 445, 645 Advanced Screen Printing Methods 3(2,3) In-depth study of the systems and materials used with the screen printing process. Emphasis is placed on techniques of control and procedures for establishing screen printing methods and standards. *Preq:* G C 207 or consent of instructor.

G C 446, 646 Ink and Substrates 3(2,3) Covers components, manufacturing, process use as well as end use of ink and substrates used in lithography, flexography, gravure, and screen printing. Examines the interrelationship between inks, substrates, and the printing process. Through controlled testing and examination, optimum conditions for improved printability are determined. *Preq:* G C 405, 406 or 440, or consent of instructor.

G C 448, H448, 648 Planning and Controlling Printing Functions 3(2,3) Study of systems for setting printing production standards, estimating, scheduling, job planning, and the selection of new hardware and technologies. *Preq:* G C 350, 405, 406, 440, 450 or consent of instructor.

G C 450 Graphic Communications Internship II 1(0,3) Continuation of G C 350. *Preq:* G C 350, 405, 406 or 440; consent of instructor. *Coreq:* CO-OP 102.

G C 451, H451 Special Projects in Graphic Communications 1-6(0,3-18) Advanced projects covering theory and/or practices going beyond the scope of regular coursework. Written project approval required before registering. May be repeated with advisor's approval. *Preq:* Junior standing, three graphic communications courses completed, or consent of instructor.

G C 455 Advanced Graphic Communications Internship 1(0,3) Full-time employment in an industry directly or indirectly related to printing. Work site and job must be approved in advance. *Preq:* G C 350.

G C 480 Senior Seminar in Graphic Communications 2(2,0) Study of current trends and issues in the graphic communications industry. Class centers around group discussions dealing with relevant topics facing the graphic communications manager today. Students draw upon academic experiences, internship experiences, and library research to facilitate discussion. Must be taken during student's last semester on campus. *Preq:* G C 450.

G C 490, 690 Graphic Communications Selected Topics 1-3 (1-3,0) Subjects not covered in other graphic communications courses; organized according to industry trends and student needs. May be repeated for a maximum of 18 credits, but only if different topics are covered. *Preq:* Consent of instructor.

GREAT WORKS

G W (ENGL) 301, H301 Great Books of the Western World 3(3,0) Introduces Great Works minor. Includes readings about the Great Books concept, as well as various great books from the humanities, arts, and natural and social sciences. *Preq:* Sophomore literature (ENGL 207 or 208 strongly recommended).

G W 402, H402 Great Works of Science 3(3,0) An understanding of science in terms of its history and its approach to problem-solving through study of selected great works. Emphasis is on de-

veloping students' abilities to reflect on the problems and methodologies encountered in the scientific method.

G W 403, H403 Special Topics in Continental Literature 3(3,0) Important primary texts written in modern European languages are taught in English. Content varies according to instructor. *Preq:* Sophomore literature.

HEALTH

Professor: D. B. Jackson; *Associate Professors:* G. E. Costello, R. Chay, C. J. Dye, K. A. Kemper, J. K. Kingree, R. Mayo, I. D. Spidler, *Research Associate:* M. Thompson; *Assistant Professors:* C. Okafor, E. Seiber, W. Sherrill; *Lecturers:* C. Chambers, K. M., Meyer, R. Welsh

HLTH 201 History and Philosophy of Public Health and Medicine 2(2,0) Explores the evolution of public health and medicine, the social and technological factors and historical turning points in their development, the philosophies and major issues of public health and medicine including beliefs about the nature and causes of health and illness, and the protection and management of community health.

HLTH 202 Introduction to Public Health 3(3,0) Examination of the forces that have influenced current health delivery systems, health practices, and trends. General systems theory is introduced. Health majors and minors will be given enrollment priority.

HLTH 203 Overview of Health Care Systems 3(3,0) Introduction to the health care delivery system including public health and health care components. Examines and discusses individual and public expectations of need and demand for health care and delivery of public health and health care services.

HLTH 240 Determinants of Health Behavior 3(3,0) Analysis of health behaviors based on psychological, social, cultural, and environmental factors. Introduction to health behavior theories. *Coreq:* Health Science major.

HLTH 250 Health and Fitness 3(3,0) Study of interrelationship between health and fitness. Emphasis is on the cardiovascular system and benefits of exercise.

HLTH 298 Human Health and Disease 3(3,0) Study of good health practices. Emphasis is on lifestyles and measures of health. Health majors and minors will be given enrollment priority.

HLTH 303 Public Health Communication 3(3,0) Introduction to the use of health and communication theory and social marketing strategies to create effective, evidence-based, culturally appropriate health communication messages and campaigns. *Preq:* HLTH 240, 298.

HLTH 305 Body Response to Health Behaviors 3(3,0) Positive benefits and the negative impact of certain behaviors at cellular, organ, and body-system levels are examined. The pathways of selected injury and disease are explored. Expected physiological changes are applied in identifying strategies for promoting health in the presence (or absence) of disease. Health majors and minors will be given enrollment priority. *Coreq:* BIOSC 223 or consent of instructor.

HLTH 310 Women's Health Issues 3(3,0) Exploration of specific health needs of women, with emphasis on understanding and preventing problems of women's health. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 315 Social Epidemiology 3(3,0) Exploration of the current problems and issues associated with the health of population groups. The interrelationships of biological, socio-cultural, behavioral, environmental, political, and economic risk factors and the health and illness patterns of those in population groups are examined. *Preq:* HLTH 298, 380 or consent of instructor.

HLTH 320 Health Maintenance for Men 3(3,0) Exploration of specific health maintenance needs of men, with emphasis on understanding and preventing problems of men's health. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 340 Health Promotion Program Planning 3(3,0) Students develop skills to conduct community health needs assessments and to plan and evaluate theoretically grounded health promotion intervention programs for diverse populations. Best practices for specific health behavior change interventions are identified. *Preq:* HLTH 240, 298.

HLTH 350 Medical Terminology and Communication 3(3,0) Skills in building, analyzing, defining, pronouncing, and spelling medical terms related to the human body are developed and applied through electronic communication. *Preq:* Junior standing or consent of instructor.

HLTH (AP EC, C R D) 361 Introduction to Health-Care Economics 3(3,0) See C R D 361.

HLTH 380 Epidemiology 3(3,0) Introduction to epidemiological principles and methods used in the study of the origin, distribution, and control of disease. Health majors and minors will be given enrollment priority. *Coreq:* Approved statistics course.

HLTH H395 Honors Research Seminar 3(3,0) Students review basic steps in the development of an honors research proposal and develop a draft of the proposal under the supervision of a faculty mentor. Students are also required to attend research presentations of senior departmental honors students. *Preq:* HLTH 380, junior standing, statistics course, or consent of instructor.

HLTH 398 Health Appraisal Skills 1(0,3) Utilizes laboratory experiences to measure health risk, interpret laboratory health data, and design personal health programs. Restricted to Health Science majors. *Preq:* HLTH 298.

HLTH 400, 600 Selected Topics in Health 1-3(1-3,0) Topics selected to meet special and individualized interest of students in health. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Junior standing, consent of instructor.

HLTH 401, 601 Health Consumerism 3(3,0) Exploration of consumer decisions regarding health products and services with emphasis on strategies for decision making. Health majors and minors will be given enrollment priority. *Preq:* Two-semester sequence in science or consent of instructor.

HLTH 402 Principles of Health Fitness 3(3,0) Students apply current theories concerning physiological effects of exercise to select new populations; understand the relationship between exercise and various chronic diseases; design, execute, and evaluate exercise programs in terms of safety and effectiveness. *Prq:* HLTH 398, CPR certification. *Coreq:* BIOSC 223.

HLTH 410, 610 Maternal and Child Health 3(3,0) Focuses on key issues concerning the health status and needs of mothers and children. Topics include primary health care, measurement and indicators of health status, health of minorities, role of families, and major programmatic interventions towards the health needs of these two groups.

HLTH 411, 611 Health Needs of High Risk Children 3(3,0) Analysis and evaluation of health needs of high risk families and special needs children from the prenatal period to age six. Emphasis is on health prevention and early intervention strategies. Early Intervention minors will be given enrollment priority. *Prq:* HLTH 410.

HLTH 415, 615 Public Health Issues in Obesity and Eating Disorders 3(3,0) In-depth review of prevalence, risk factors, consequences, and treatments of obesity and other eating disorders. Focuses on the public health importance of cultural norms, prevention, and early intervention related to obesity and eating disorders. *Prq:* Junior standing in Health Science or consent of instructor.

HLTH 419 Health Science Internship Preparation Seminar 1(1,0) Preparation for internship experience including topics such as résumé development, interviewing skills, internship agency selection, and responsibilities of student, department, and agency. *Prq:* Junior standing in Health Science.

HLTH 420, 620 Health Science Internship 1-6(0,3-18) Under supervision in an approved agency, students have an opportunity for on-the-job experiences. Students are placed in an agency and develop personal/professional goals and objectives appropriate to the setting, population, and health issues. Students create a comprehensive exit portfolio in a digital format. May be repeated for a maximum of six credits. *Prq:* HLTH 419, minimum grade-point ratio of 2.0, Junior standing in Health Science.

HLTH 430, 630 Health Promotion of the Aged 3(3,0) Focuses on analysis and evaluation of health issues and health problems of the aged. Emphasis is on concepts of positive health behaviors. Health majors and minors will be given enrollment priority. *Prq:* Developmental psychology; two-semester sequence in science; or consent of instructor.

HLTH 431 Public and Environmental Health 3(3,0) Principles of environmental health, with emphasis on understanding various health concerns created by the interactions of people with their environment. Students evaluate the impact of environmental factors on public health policy decisions. Meets specific area of need in environmental health issues.

HLTH 440 Management Health Service Organizations 3(3,0) Provides the conceptual and theoretical foundation of management and organizational theory of health service organizations. Focus is on role of health services managers and how they modify and maintain organizations.

HLTH 450, 650 Applied Health Strategies 3(3,0) Students plan, implement, and evaluate strategies to promote health through individual behavior changes. Both healthful and unhealthful behaviors are included. Examples include smoking cessation, weight management, and stress management. Restricted to Health Science majors. *Prq:* HLTH 480.

HLTH 460 Health Information Systems 3(3,0) Focus on the application of information systems to patient care and management support systems. Provides a general understanding of how the information needs of health professionals and health service organizations can be met through the proper acquisition, storage, analysis, retrieval, and presentation of data.

HLTH 470 International Health 3(3,0) Deepens students' knowledge of global health and how public health work is conducted internationally. Introduction to assessment of international health needs and designing, implementing, managing, and evaluating public health programs in international settings. *Prq:* HLTH 298.

HLTH 475 Principles of Healthcare Operations Management and Research 3(3,0) Provides a foundation in concepts, structure, and analysis that enables an understanding of the importance of production/operations management within healthcare organizations and systems. Includes training in operations research methods and objectives. *Prq:* HLTH 490.

HLTH 478 Health Policy Ethics and Law 3(3,0) Critical examination of the legal and ethical dimensions of public health policy formation and change and how legal, ethical, and policy considerations influence health services administration and delivery. Health majors and minors will be given enrollment priority. *Prq:* HLTH 202, 240, 298, 380 or consent of instructor.

HLTH 479 Financial Management and Budgeting for Health Service Organizations 3(3,0) Overview of basic principles of budgeting and financial management and analysis for health services organizations. Techniques for financial management are provided with an emphasis on health services environments. *Prq:* HLTH 440.

HLTH 480 Community Health Promotion 3(3,0) Focuses on the participatory approach in the planning and implementation of community health programs. Emphasizes professional ethics, needs assessment, coalition building, proposal writing, and implementation of special events in the community. *Prq:* HLTH 303, 340, 380, Health Science major.

HLTH 490 Research and Evaluation Strategies for Public Health 3(3,0) Discussion of research in health. Focus on analysis of reported research. Ethical, moral, and legal issues are discussed. *Prq:* EX ST 301, MTHSC 203, or 301.

HLTH H495 Honors Thesis Seminar 3(3,0) Senior honors thesis seminar in public health sciences. Independent research is conducted under the supervision and guidance of a faculty mentor for students enrolled in departmental honors program in support of an honors thesis/service learning research project. *Prq:* HLTH H395, Senior standing, or consent of instructor.

HLTH H496 Honors Research Colloquium 1(1,0) Students enrolled in departmental honors present independent research conducted under the supervision of a faculty member in a public research forum to other honors students and public health professionals and/or submit a paper or presentation based on this research for publication. *Prq:* HLTH H495, Senior standing.

HLTH 498, 698 Improving Population Health 3(3,0) Critical examination of current and emerging issues in improving public health practice and population health. Covers examples in empirical and applied research, revealing future trends in population health. Health Science majors and minors will be given enrollment priority. *Prq:* HLTH 240, 298, 380, or consent of instructor.

HLTH 499 Independent Study 1-3(1-3,0) Study of selected problems in health under the direction of faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration. May be repeated for a maximum of three credits. *Prq:* Junior standing or consent of instructor.

HISTORIC PRESERVATION

Professor: J. Burden

H P 410, 610 History and Theory of Historic Preservation 3(3,0) Survey history of preservation that explores a variety of theoretical issues that impact the discipline. Provides a basis for critical evaluation of historic preservation. *Prq:* Three semesters of Art and Architectural History or equivalent or consent of instructor.

H P 411, 611 Research and Documentation in Historic Preservation 3(3,0) Introduction to documenting and recording historic buildings and landscapes. Charleston and its environs provide case study projects for archival research, field investigation, and preparation of final documentation. *Prq:* Three semesters of Art and Architectural History or equivalent or consent of instructor.

H P 412, 612 Materials and Methods of Historic Construction 3(3,0) Survey of traditional materials and methods of construction in America from the 18th through the early 20th century. Scientific examination of historic construction provides case studies. *Prq:* Three semesters of Art and Architectural History or equivalent or consent of instructor.

HISTORY

Professors: J. L. Arbena, E. D. Carney, H. R. Grant, T. J. Kuehn, Chair, S. G. Marks, D. M. McKale, E. E. Moise, D. M. Nicholas, J. V. Reel, Jr.; *Associate Professors:* S. L. Barczewski, J. M. Burns, C. A. Grubb, P. E. Mack, R. L. Saunders, Jr., W. F. Steirer, Jr.; *Assistant Professors:* P. C. Anderson, J. R. Andrew, Jr., M. N. Taylor-Shockley; *Adjunct Lecturer:* M. S. Silvestri

HIST 100 Higher Education and Clemson 1(1,0) Introduction to higher education; its background and development in the western world, emphasizing land-grant institutions and Clemson University in particular.

HIST 101, H101 History of the United States 3(3,0) Political, economic, and social development of the American people from the period of discovery to the end of Reconstruction.

HIST 102, H102 History of the United States 3(3,0) Political, economic, and social development of the American people from the end of Reconstruction to the present.

HIST 122, H122 History, Technology, and Society 3(3,0) Topics in the history of technology with emphasis on how technology affects society and how society shapes technology. Emphasis is on 19th and 20th century America, but some material from other periods of Western Civilization and other world regions may be discussed.

HIST 172, H172 Western Civilization 3(3,0) Political, economic, and social movements of Western civilization from ancient times to the 17th century.

HIST 173, H173 Western Civilization 3(3,0) Political, economic, and social movements of Western civilization from the 17th century to the present.

HIST 193 Modern World History 3(3,0) Political, economic, social, and cultural history of the modern world from the 19th century to the present.

HIST 198 Current History 1(1,0) Examination of the major events and problem areas in the news with emphasis on their historical context and possible long-range significance. May be repeated for a maximum of three credits. Does not count toward the requirements of the major or minor in History.

HIST 200 Fort Hill Internship 1(0,1) Provides practical experience in public history museum work and historical preservation. May be repeated for a maximum of three credits. Does not count toward the major or minor in History. To be taken Pass/Fail only. *Preq:* Consent of department chair.

HIST 201 Prelaw Internship 3 SS Faculty-supervised internship in law firm or other legal setting. Introduces students who are interested in law school to the workings of the legal system. To be taken Pass/Fail only. *Preq:* History major or minor and HIST 328 or 329 (with consent of internship coordinator).

HIST 300 History of Colonial America 3(3,0) Development of American institutions and customs in the period before 1776. Considerable emphasis is placed on the imperial relations between Great Britain and her colonies and upon the movement towards and the philosophy of the American Revolution.

HIST 301 American Revolution and the New Nation 3(3,0) Study of the various historical explanations leading to an understanding of the American Revolution, the establishment of the Nation under the Constitution, and the first decade of the new nation. Special emphasis is on developing an understanding of individual motivation and ideological development present during the last four decades of the 18th century.

HIST 302 Age of Jefferson, Jackson, and Calhoun 3(3,0) Formation and growing pains of the new nation through the Federal and Middle periods of its history, with emphasis on economic and political development, the westward movement, and the conflicting forces of nationalism and sectionalism.

HIST 303 Civil War and Reconstruction 3(3,0) Study of the political, military, and social aspects of the sectional conflict and of the era of Reconstruction. Some emphasis is placed on the historical controversies which the period has inspired.

HIST 304 Industrialism and the Progressive Era 3(3,0) Study of American society in the period between the 1880s and 1930s. Emphasizes the effects of industrialization and urbanization on the American people.

HIST 305 The United States in the Age of the World Wars 3(3,0) Examination of the changes in the American experiences through two world wars, a depression, the Prohibition era, and the assumption of international responsibilities.

HIST 307 Recent America 3(3,0) Examination of the American experience from the end of World War II through the period of the Korean and Vietnam wars, the Cold War, the Civil Rights movement, the counter-culture of the 1960s, assassinations, and Watergate.

HIST 311 African Americans to 1877 3(3,0) Study of the African-American experience in the United States from the African past through slavery to 1877.

HIST 312 African American History from 1877 to the Present 3(3,0) Study of African American experience in the United States from 1877 to the present.

HIST 313, H313 History of South Carolina 3(3,0) Political, economic, and social development of South Carolina from 1670 to the present.

HIST 314 History of the South to 1865 3(3,0) [W.2] Origins and development of political, social, economic, and cultural institutions of the South from the Colonial period to the end of the Civil War and the role of the South in the nation's development.

HIST 316 American Social History 3(3,0) Study of American society, including the relationship among classes, ethnic groups, regions, and sexes, from the Colonial period to the present.

HIST 318 History of American Women 3(3,0) [W.2] Survey course of the history of American women emphasizing the changing role of women in American culture and society.

HIST 319 Women and Law in United States History 3(3,0) Survey of the legal status of women throughout United States history. Emphasis is on the relationship between legal rules and social conditions and the way in which law defined the status of women over time and helped change their status and rights.

HIST 321 History of Science 3(3,0) Survey of the development of science in the Western world, emphasizing the period from the Renaissance to the present.

HIST 322 History of Technology 3(3,0) History of the major developments in Western technology and their relationships to the societies and cultures in which they flourished.

HIST 323 History of American Technology 3(3,0) [W.1] History of developments in technology and their role in American life with particular emphasis on the American Industrial Revolution and the 20th century.

HIST 324 History of the South, 1865 to the Present 3(3,0) [W.1] Development of political, social, and cultural institutions of the South from the end of the Civil War to the present and the South's relationship to the rest of the nation.

HIST 325 American Economic Development 3(3,0) Economic development of the United States from Colonial to recent times, emphasizing the institutional development of agriculture, banking, business and labor, and government regulations and policy.

HIST 327 American Business History 3(3,0) Survey of the history of American business using a case-study approach. Focus is on the effects that policies and institutions have on individual businesses.

HIST 328 United States Legal History to 1890 3(3,0) Survey of American legal system in its historical perspective from Colonial times to 1890. Emphasis is on the relationship between law and society, the way in which the practice of law changed American society, and the way in which social development affected both the theory and practice of the law.

HIST 329 United States Legal History Since 1890 3(3,0) Examination of the social, cultural, intellectual, economic, and political forces that have helped shape the law in the U. S. since 1890.

HIST 330 History of Modern China 3(3,0) Growth and development of Chinese civilization from ancient times to the present. Emphasis is on 20th century China, particularly since the rise to power of the Communist regime.

HIST 333 History of Modern Japan 3(3,0) Origin and development of Japanese civilization with particular emphasis on modern Japan from mid-19th century to the present.

HIST 334 Premodern East Asia 3(3,0) Introduction to histories of China and Japan, from antiquity to approximately 1850. Political, religious, artistic, and other aspects of premodern society are examined and compared in order to gain significant insights regarding the premodern antecedents of these two dynamic and important nations.

HIST 337 History of South Africa 3(3,0) Examines the important trends in the history of South Africa from earliest times to the present. Topics include nature of pre-colonial society, European immigration, rise of industrial capitalism, advent of Apartheid, and the liberation struggle.

HIST 338 African History to 1875 3(3,0) Study of sub-Saharan Africa from antiquity to European colonial rule, exploring the development of Stone Age cultures; agricultural and pastoral societies; ancient civilizations; political, economic, and social systems; gradual shift of initiative from the interior to the coast; and various slave trades.

HIST 339 Modern Africa, 1875 to the Present 3(3,0) Study of sub-Saharan Africa from 1875 to the present, with the focus placed upon the development and decline of European imperialism, dilemmas of African independence, and ethnic struggles in Southern Africa.

HIST 340 Ancient Americans 3(3,0) Introduction to the geography of the Western Hemisphere; origin of human life in the Americas; structure and accomplishments of the major pre-Columbian societies, with emphasis on the rise and decline of the Classic civilizations; the impact of the European conquest; the formation of a new Ibero-American culture.

HIST 341 Modern Mexico 3(3,0) Introduction to the geography of the region, origins, and progress of the Independence movements and political, economic, and social developments after 1825; current domestic and international problems.

HIST 342 South America Since 1800 3(3,0) Introduction to the geography of the region; origins and progress of the Independence movements; political, economic, and social developments after 1825; current domestic and international problems.

HIST 351 Ancient Near East 3(3,0) History of the peoples and civilizations of the Near East from the Sumerians to the establishment of Roman power in this region. Geography, mythology, religious, and economic currents, as well as the methods and discoveries of archaeology are included.

HIST 352 Egypt in the Days of the Pharaohs 3(3,0) Egyptian civilization from its beginning until the period of Roman conquest. Includes a survey of political history, but also deals with daily life, making much use of archaeological evidence.

HIST 353 Women in Antiquity 3(3,0) [W.2] Focuses on women in the ancient period in Mesopotamia, Israel, Egypt, Greece, Rome, and in the early Christian Church. Formation of gender roles and issues related to ancient sexuality also receive attention.

HIST 354 The Greek World 3(3,0) Study of Greek civilization from its beginning until the time of the Roman conquest, concentrating on the social institutions of the Greek city-states.

HIST 355 The Roman World 3(3,0) The rise of Rome to world empire and the international civilization it dominated. Concentration on the nature of the political change from Republic to monarchy with particular emphasis on city life and the causes of its decline.

HIST 361 History of England to 1688 3(3,0) [W.2] Evolution of English political, social, economic, and cultural institutions to the 17th century. (Study Abroad)

HIST 363 History of England Since 1688 3(3,0) Evolution of English political, social, economic, and cultural institutions from the 17th century to the present.

HIST 365 English Cultural History 3(3,0) [W.2] Survey of the cultural history of England, from Anglo-Saxon times to the present, focusing on the period after the English Renaissance.

HIST 370 Medieval History 3(3,0) Survey of the period from the eclipse of Rome to the advent of the Renaissance, emphasizing human migrations, feudalism, rise of towns, and cultural life.

HIST 372 The Renaissance 3(3,0) Examination of the transitional period of European civilization (ca. 1300–1500), with emphasis on institutional, cultural, and intellectual developments.

HIST 373 Age of the Protestant Reformation 3(3,0) [W.2] Evolution of Modern Europe (ca. 1500–1660), as affected by the Reformation, wars of religion, and growth of nation-states. Study includes intellectual advances and the beginnings of European expansion overseas.

HIST 374 Europe in the Age of Reason 3(3,0) Study of the quest for order and the consolidation of the European state system between 1660 and 1789 with emphasis on the idea of absolutism, the question of French hegemony, and the synthesis of the 18th-century Enlightenment.

HIST 375 Revolutionary Europe 3(3,0) History of Europe from the outbreak of the French Revolution through the Revolutions of 1848, with emphasis on the conflict between the forces of change and those of conservatism, within the states and in Europe in general.

HIST 377 Europe, 1914–1945 3(3,0) Focus on Europe during two major wars and the peacetime adjustments Europeans made, or failed to make, during the twenty-year interim between those wars.

HIST 378 Europe Since 1945 3(3,0) Focus on how World War II completed the destruction of European global hegemony, creating a bipolar continent with the west dominated by the United States and the east by Soviet Russia; and how Europe adjusted to this situation.

HIST 380 Imperial Germany 3(3,0) German history from the beginning of the German Empire, 1870–71, through World War I. Emphasizes the influence of militarism, nationalism, anti-Semitism, and xenophobia on the German culture and political process.

HIST 381 Germany Since 1918 3(3,0) German history from the time of Germany's defeat in World War I, through the Nazi period and World War II. Culminates with the study of a divided Germany.

HIST 384 History of Modern France 3(3,0) French history from mid-19th century to the present with particular emphasis on France since 1900.

HIST 385 History of Imperial Russia 3(3,0) Survey of the formative years of the Russian Empire from the time of accession of Peter the Great to the time of the Russian Revolution. Social, political, diplomatic, and intellectual developments are given equal treatment.

HIST 386 History of the Soviet Union 3(3,0) Soviet history from the revolution to the present. Surveys the creation and subsequent development of the communist political and social system, with attention given to culture and diplomacy.

HIST 387 The Russian Revolution 3(3,0) [W.2] History of one of the most formative series of events of the 20th century. Follows the crisis of Imperial Russia, its downfall during World War I, and subsequent revolutionary upheaval leading to the formation of the USSR.

HIST 390 Modern Military History 3(3,0) Survey of the development of modern warfare and the influence of technological change on warfare. Particular attention is given to the major conflicts of the 20th century.

HIST 391 Post World War II World 3(3,0) The world in the age of the Cold War, the breakdown of the colonial empires, and racial, religious, ethnic, national, and social tensions. The United States provides the central core to the class.

HIST (F&RR) 392 History of the Environment of the United States 3(3,0) Examination of the historical development of the attitudes, institutions, laws, people, and consequences that have affected the environment of the United States from pre-Columbian days until the present. Emphasis is placed on the interaction of human beings within and with the environment.

HIST 393 Sports in the Modern World 3(3,0) Analysis of the global evolution and diffusion of sports in the industrial age, with an emphasis on the linkage of sports structure and performance to the larger social context.

HIST 394 Non-Western History 3(3,0) Examines the important trends in world history since 1500—including capitalism, industrialization, nationalism, migration, and imperialism—with a focus on non-Western regions. *Preq:* HIST 173.

With departmental consent, any 400- or 600-level course in history may be repeated once for credit. The 400-level courses require students to do historical research and writing.

HIST 400, 600 Studies in United States History 3(3,0) Topics and problems in the history of the United States from the Colonial era to the present.

HIST 420 History and Film 3(2,3) Analyzes the role of the cinema in the construction and dissemination of history.

HIST 428, 628 A Famous American Trial in History 3(3,0) Study of the social, cultural, and legal context of a famous American trial. Consideration is given to the actual trial record (transcripts, briefs, and opinions on appeal) and to historical studies of the time and place in which the trial arose. Trial selected varies. *Preq:* HIST 328 or 329 or consent of instructor.

HIST 436, 636 The Vietnam Wars 3(3,0) Wars in Vietnam are seen in two phases. The First Indochina War, 1946–54, is covered briefly. Main body of the course covers the Second Indochina War, which began as a guerrilla conflict in 1959, 60 and ended as a mostly conventional war in the Communist victory of 1975.

HIST 438, 638 Problems in African Historiography and Methodology 3(3,0) Concentrates on major issues in the field of African history with an additional focus on methodological concerns.

HIST 440, 640 Studies in Latin American History 3(3,0) Consideration of selected and varied topics in Latin American history through readings, class discussions, and individual or group projects. Special attention is given to the use of an inquiry or problem-solving method of historical analysis and to the cultivation of a comparative perspective.

HIST 450, 650 Studies in Ancient History 3(3,0) Selected topics in ancient history ranging from pre-Biblical times to the fall of the Roman Empire.

HIST 451, 651 Alexander the Great 3(3,0) Focuses on the career of Alexander the Great and deals with the history and archaeology of ancient Macedonia.

HIST 460, H460, 660 Studies in British History 3(3,0) Examination of selected themes, topics, or periods in British history from Anglo-Saxon times to the present.

HIST 470, 670 Studies in Early European History 3(3,0) Study of selected topics or themes in European history from the fall of the Roman Empire to the age of industrialization.

HIST 471, H471, 671 Studies in Modern European History 3(3,0) Study of selected topics or problems in European history from the end of the Old Regime to the present.

HIST 490 Senior Seminar 3(3,0) Seminar in current research themes in history. Students do directed research on a particular topic. Seminar topics vary from section to section and from semester to semester. *Preq:* Senior standing or consent of instructor.

HIST 491, H491, 691 Studies in the History of Science and Technology 3(3,0) Selected topics in the development of science and technology, with emphasis on their social, political, and economic effects.

HIST 492, 692 Studies in Diplomatic History 3(3,0) Selected topics and problems in international conflict and conflict resolution among nations. Concentration is usually in 20th century history.

HIST 493, 693 Studies in Social History 3(3,0) Studies in the ways people have earned their livings and lived their lives, individually and as communities, in the confines of different societies.

HIST 494, 694 Studies in Comparative History 3(3,0) Selected topics in comparative history, contrasting and comparing similar historic developments in different nations, geographic areas, or civilizations.

HIST 495, 695 Studies in the History of Ideas 3(3,0) Selected topics and themes in the development of ideas that have had an impact on the behavior of individuals and civilizations.

HIST 496, 696 Studies in Legal History 3(3,0) Study of selected problems in the development of law and the system of criminal and civil justice.

HIST H497 Senior Honors Research 3(3,0) Research for the preparation of senior honors thesis. *Preq:* Senior standing, completion of a 400-level history course, approval of the History Department.

HIST H498 Senior Honors Thesis 3(3,0) Writing of the senior honors thesis. *Preq:* HIST H497.

HIST 499 Independent Study 1-3(1-3,0) Study of selected problems in history under the direction of a faculty member chosen by the student. Student and faculty member develop a course of study designed for the individual student and approved by the department chair prior to registration.

HORTICULTURE

Professors: W. V. Baird, D. W. Bradshaw, M. T. Haque, L. B. McCarty, T. Whitwell, *Chair, Associate Professors:* J. D. Caldwell, H. Liu, *Assistant Professors:* J. W. Adelberg, J. E. Faust, C. E. Wells

HORT 101 Horticulture 3(3,0) Environmental factors and horticultural practices affecting optimum production of floral, fruit, ornamental, and vegetable crops. Survey of the various areas of horticulture and their importance to society.

HORT 202 Selected Topics 1-3(1-3,0) Introduction to developing trends/concepts/technologies in horticulture. May be repeated for a maximum of three credits or a maximum of three credits in combination with HORT 400, but only if different topics are covered. *Preq:* Consent of instructor.

HORT 208 Landscape Appreciation 3(3,0) Students' appreciation of natural and built environments through a study of landscape elements, styles, and professions. Landscapes ranging in scale from residential to regional are critiqued, and design principles and landscape ethics are discussed.

HORT 212 Introduction to Turfgrass Culture 3(3,0) Studies of the introductory principles associated with the art and science of turfgrass culture. Develops an understanding of the history and evolution of turfgrasses and turfgrass culture. Explores career potentials in turfgrass management. Explains the basic scientific principles and techniques associated with the propagation and establishment of fine turfgrasses. *Preq:* BIOSC 205, 206.

HORT 213 Turfgrass Culture Laboratory 1(0,2) Provides hands-on activities and understanding of basic principles and techniques in turfgrass culture. Students learn all phases of turfgrass management including identification, turfgrass culture, common turfgrass pest identification and control. *Coreq:* HORT 212.

HORT 271 Internship 1-6(0,2-12) Preplanned, practical, supervised work experience to give beginning students on-the-job learning opportunities that support classroom experience. Students submit monthly reports and present a departmental internship seminar. Undergraduates may accumulate a maximum of six credits for participation in HORT 271 and/or 471. *Preq:* Consent of instructor.

HORT 303 Plant Materials 3(2,3) Woody, ornamental plants and their aesthetic and functional uses in landscape developments. Study covers habit of growth, ultimate size, texture effect, period of bloom, color, and cultural requirements.

HORT 304 Annuals and Perennials 3(2,3) Annual and perennial flowers' aesthetic appeal and functional uses and needs. Color, texture, bloom time, form, size, and growth requirements as they relate to designing, planting, and maintaining colorful landscapes. *Preq:* HORT 208, 303, or consent of instructor.

HORT 305 Plant Propagation 3(2,3) All phases of plant propagation from seeds, bulbs, divisions, layers, cuttings, budding, and other types of grafting are comprehensively treated. Timing, manner, and material for making cuttings; temperature and media requirements and propagation structures for rooting cuttings of ornamental and fruit trees, shrubs, and indoor plants are studied.

HORT 306 Plant Propagation Techniques Laboratory 1(0,3) Techniques of plant propagation including sexual methods: germination, scarification, and stratification. Asexual methods including grafting, budding, cuttings, layering, tissue culture divisions, and separations. Local nurseries are visited. *Coreq:* HORT 305.

HORT 308 Landscape Design 4(3,3) Landscape planning of residential and public properties in order to achieve best use and most enjoyment from a given piece of ground. *Preq:* HORT 208, 303, or consent of instructor.

HORT 310 Greenhouse Crop Physiology 3(2,3) Physiology, growth, and development of floriculture crops in fully or semi-controlled environments, including manipulation of flowering, chemical and environmental height regulation, fertility in artificial substrates, scheduling, cost analysis, and pest management. *Preq:* CSENV 202, HORT 101, or consent of instructor.

HORT 316 Floral Design 3(2,3) Topics include simple arrangements (history, containers, mechanical aids, etc.), arrangements for specific occasions, church arrangements, funeral designs, bride's bouquets, dried arrangements and flower preservation, corsage work, foliage arrangements, bonsai, terrarium, Christmas wreaths, and foliage plant identification.

HORT 400 Selected Topics 1-3(1-3,0) In-depth examination of developing trends/concepts/technologies in horticulture. May be repeated for a maximum of three credits or a maximum of three credits in combination with HORT 202, but only if different topics are covered. *Preq:* Junior standing or consent of instructor.

HORT 406, 606 Nursery Technology 3(2,3) Principles and techniques in handling nursery crops. *Preq:* HORT 303, 305.

HORT 408 Special Problems in Horticulture 1-3(0,3-9) Independent investigation in horticulture. Emphasis is on organizing a quality proposal, conducting the investigation, and reporting findings at a professional society meeting and/or in a professional publication. Cumulative maximum of three credits. *Preq:* Minimum of 75 hours completed and consent of instructor.

HORT 409 Seminar 1(1,0) Recent research work on various phases of horticulture, methods of conducting investigations, and preparation of report of investigations.

HORT 412, 612 Turfgrass Management 3(2,3) Study of warm and cool season turfgrasses in relation to value, use, regional adaptation, establishment, soils, and cultural practices. Influence of environmental, cultural, and genetic factors on turf quality and serviceability. Identification of grass and weed species and discussion of programs for the management of lawns, parks, roadsides, and golf courses. *Preq:* BIOL 103 or equivalent.

HORT 420, 620 Contemporary Issues in Turfgrass Science and Management 3(3,0) Focuses on contemporary issues in turfgrass science and management. Provides the most current status of the development of the turfgrass industry, environmental stewardship, and turfgrass research. *Preq:* HORT 212, 213.

HORT (FOR) 427, 627 Urban Tree Care 3(3,0) See FOR 427.

HORT (CSENV) 433, 633 Integrated Weed Management for Agronomic and Horticultural Crops 3(2,2) Weed management systems consisting of cultural, chemical, and biological methods are studied for the major agronomic and horticultural crops of South Carolina with problem-solving methodology and herbicide injury diagnosis. *Preq:* CSENV 407 or equivalent introductory weed science.

HORT 455, 655 Small Fruit Crops 3(2,3) In-depth survey of taxonomical, morphological, and physiological characteristics of small fruit crops as they relate to the study of horticultural characteristics, culture, production, harvesting, and handling of both commercial and home-grown grapes, blueberries, strawberries, brambles, and kiwifruit. *Preq:* HORT 101 or consent of instructor.

HORT 456, 656 Vegetable Crops 3(3,0) Principles and practices employed in commercial growing and marketing of vegetable crops with emphasis on plant characteristics, cultivars, management practices, harvest, quality factors and grading, storage, economic importance, and areas of production.

HORT 461, H461, 661 Problems in Landscape Design 4(3,3) Landscape planning for larger residential properties, schools, industrial plants, real estate developments; detailed finished plans; further study of materials used; original problems; field study. *Preq:* HORT 308, 407, or consent of instructor.

HORT (BIOSC, GEN) 465, 665 Plant Molecular Biology 3(3,0) Study of fundamental plant processes at both the cellular and molecular levels. Topics include genome structure and organization (both nuclear and organellar); regulation of gene expression and its role in cellular and whole-plant processes; transposable genetic elements; applications for biotechnology. *Preq:* Junior standing or consent of instructor; BIOSC 304 or 305; GEN 302.

HORT 471, 671 Advanced Internship 1-6(0,2-12) Preplanned work experience under competent supervision in approved agency dealing with horticultural endeavors. Gives advanced students on-the-job learning opportunities to apply acquired knowledge and skills. Monthly reports and final departmental seminar required. Undergraduates may accumulate a maximum of six credits for participation in HORT 271 and/or 471. *Preq:* Junior standing and consent of instructor.

HORT 472, 672 Garden Experiences in Youth Development 2(1,3) Exploration of the role of gardening and related outdoor experiences in enhancement of educational development, self-esteem and pro-social behavior in elementary school children. *Preq:* Junior standing and consent of instructor.

HUMANITIES

Professor: S. K. Eisinger; Associate Professor: A. Bennett

HUM 301 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with prehistory and continuing to the Renaissance.

HUM 302 Humanities 3(3,0) Introduction to humanistic studies focusing on relationships among disciplines—painting, sculpture, architecture, music, literature, philosophy, and drama—beginning with the 17th century and continuing to the present.

HUM 306 Creative Genius in Western Culture 3(3,0) Investigation of creativity through study of great innovators in art, literature, music, and ideas. May be repeated once for credit.

HUM 309 Studies in Humanities 3(3,0) Interdisciplinary approach to the humanities. Special subject matter varies according to the instructor and as approved by the chair of the English Department. May be repeated once for credit.

HUM (ENGL) 456, 656 Literature and Arts of the Holocaust 3(3,0) See ENGL 456.

INDUSTRIAL ENGINEERING

Professors: A. K. Gramopadhye, Chair; D. L. Kimbler, M. S. Leonard; Associate Professors: B. R. Cho, W. G. Ferrell, Jr., J. S. Greenstein, B. J. Melloy; Assistant Professor: M. E. Kurz

I E 201 System Design I 4(3,3) Introduction to the design of industrial engineering systems. Design methodologies are introduced in the context of a design process that includes identifying user needs; developing a design specification; generating, evaluating, refining, and selecting design concepts; detail design; constructing, testing, and refining prototypes; and delivering the product to the customer. *Preq:* ENGR 120.

I E 210 Design and Analysis of Work Systems 4(3,3) Facilities planning and design, workplace design, ergonomics of workplace design, performance measurement, and methods engineering.

I E 220 Design of Information Systems in Industrial Engineering 3(3,0) [C.2] Introduction to Visual Basic and object-oriented programming principles, databases, and software applications of human-centered system design.

I E 280 Methods of Operational Research I 3(3,0) Introduction to operations research models, including linear programming, integer linear programming, transportation and assignment problems, and network flows. *Preq:* MTHSC 206.

IE H300 Junior Honors Seminar 1(1,0) Aquaints students enrolled in the Departmental Honors Program with current research issues in the profession. This assists students in preparing a research proposal for the senior thesis. *Preq:* Junior standing, admission to Departmental Honors Program.

IE 361 Industrial Quality Control 3(3,0) Quality engineering techniques focusing on process control using statistical methods including control charts and acceptance sampling. *Preq:* MTHSC 302.

I E 368 Professional Practice in Industrial Engineering 1(1,0) Seminar to orient students to issues of professional development and professional practice of industrial engineering. *Preq:* IE 201.

I E 381 Methods of Operational Research II 3(3,0) Probabilistic modeling of engineering systems. Topics include calculus-based probability, decision analysis, Markov processes, queueing, and reliability. *Preq:* MTHSC 208 and 302 or consent of instructor.

I E 384 Engineering Economic Analysis 3(3,0) Basic principles and techniques of economic analysis of engineering projects. Consideration of time, value of money, short- and long-term investments, replacement analysis, depreciation methods, cost allocation, and measures of cost effectiveness. *Preq:* MTHSC 108.

I E 386 Production Planning and Control 3(3,0) Fundamentals of forecasting demand, scheduling production, and controlling the movement and storage of material associated with production are studied. State-of-the-art manufacturing techniques are discussed. A design project is required. *Preq:* IE 280, 384.

IE 440, 640 Systems and Information 3(3,0) Design and analysis of information-based production and service systems, issues in networked data, design and knowledge tools. *Preq:* IE 220.

I E (MGT) 444 International Perspectives in Industrial Management 3-6(3-6,0) See MGT 444.

I E 452, 652 Reliability Engineering 3(3,0) Probabilistic approach to assessing system reliability. Methods for analyzing serial, parallel, and complex systems. Reliability life testing and its acceleration are covered. Essential elements of maintainability are identified and related to system availability. *Preq:* MTHSC 206 and 302 or consent of instructor.

I E 456, 656 Supply Chain Design and Control 3(3,0) Industrial engineering aspects of supply chains including design and control of material and information systems. *Preq:* IE 386 or equivalent.

I E 460, 660 Quality Improvement Methods 3(3,0) Study of modern quality improvement techniques presented in an integrated, comprehensive context. *Preq:* Senior standing.

I E 461, 661 Quality Engineering 3(3,0) Design aspects of quality and the engineer's role in problems of quality in production systems. *Preq:* IE 361.

I E 465, 665 Facilities Planning and Design 3(3,0) Study of the principles and techniques of plant layout. Economic selection of materials handling equipment and integration of this equipment into the layout plan to provide effective product flow. Quantitative techniques for evaluation of facilities plans. A design project is required. *Preq:* IE 210 and 280 or consent of instructor.

I E 467 Systems Design II 3(2,3) Provides students with the challenge of integrating and synthesizing general engineering knowledge into creatively solving real-world, open-ended problems. This includes developing the problem statement, objectives, and criteria; data collection; technical analysis; developing and integrating recommendations; and presenting results. *Preq:* All engineering courses at the 200 and 300 level in the Industrial Engineering curriculum.

I E 482, 682 Systems Modeling 3(3,0) Modeling of discrete industrial systems using a digital computer. The purpose, theory, and techniques of system modeling are presented. *Preq:* IE 381 and MTHSC 302 or consent of instructor.

IE (B, E, EE&S) 484, 684 Municipal Solid Waste Management 3(3,0) See EE&S 484.

I E 485, 685 Industrial Systems Engineering 3(3,0) Modeling and analysis of multistage decision processes, recursive optimization, process and system design, and control problems. *Preq:* IE 280 and 381 or consent of instructor.

IE 487, 687 Industrial Safety 3(3,0) Recognition and prevention of hazards; recognition and control of hazardous materials; developing and managing a safety program; designing inherently safe equipment and workplaces. *Preq:* Junior standing.

IE 489, 689 Industrial Ergonomics and Automation 3(2,3) Physical ergonomics and ergonomics in industrial settings, including work physiology, the physical environment, automated systems, and hybrid work systems. *Preq:* IE 210 or consent of instructor.

IE 491, H491, 691 Selected Topics in Industrial Engineering 1-3(0-3,0-9) Comprehensive study of any timely or special topic in industrial engineering not included in other courses. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

IE 492, H492, 692 Design Topics in Industrial Engineering 1-3 Comprehensive study of any timely or special design topic in industrial engineering. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

INTEGRATED PEST MANAGEMENT

Professor: D. Alverson

IPM 401, 601 Principles of Integrated Pest Management 3(3,0) Origins, theory, and practice of integrated pest management. Relationships among crop production and protection practices are explored. Economics of various control strategies are considered. Integrated pest management field projects are studied. Conventional and integrated pest management approaches are compared. Multidisciplinary plant problem analysis is introduced. *Preq:* CSENV 407, ENT 301, PL PA 401, or consent of instructor.

ITALIAN

Associate Professor: B. M. Zaczek; *Lecturer:* J. Bridgwood

ITAL 101 Elementary Italian 4(3,1) Introductory course stressing grammar, pronunciation, oral practice, and reading skills. Attention is given to practical everyday living as well as cultural considerations.

ITAL 102 Elementary Italian 4(3,1) Continuation of ITAL 101. *Preq:* ITAL 101 or consent of instructor.

ITAL 201, H201 Intermediate Italian 3(3,1) Intermediate course to build on the foundation of previous language courses, with practice in listening, speaking, reading, and writing. Introduction to cultural perspectives through readings of literary prose selections. *Preq:* ITAL 102.

ITAL 202, H202 Intermediate Italian 3(3,1) Increasingly difficult readings in Italian literature, supplemented with classroom discussions and compositions. *Preq:* ITAL 201.

ITAL 301 Introduction to Italian Literature 3(3,0) Study of selected texts of Italian literature in their artistic, cultural, and social context. May include theme and genre studies. *Preq:* ITAL 202 or consent of department chair.

ITAL 302 Modern Italian Literature 3(3,0) Study of selected works from major 19th and 20th century Italian authors, including Manzoni, Verga, Svevo, Moravia, Ginzburg. *Preq:* ITAL 202 or consent of department chair.

ITAL 305 Intermediate Italian Conversation and Composition 3(3,0) Practice in the written and spoken language with emphasis on vocabulary, pronunciation, and comprehension. *Preq:* ITAL 202 or consent of department chair.

ITAL 307 Italian Civilization and Culture 3(3,0) Study of the significant aspects of Italian civilization and culture through analysis of literary texts, paintings, films, and magazine articles. *Preq:* ITAL 202 or consent of department chair.

ITAL 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Italian literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

ITAL 400 Image of an Italian City 3(3,0) Study of historical, social, and architectural images of Italian cities through analysis of literary texts and films. *Preq:* ITAL 202 or consent of instructor.

ITAL 498 Selected Topics 3(3,0) Study of selected topics in Italian literature, language, and culture. Taught in Italian. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of department chair.

JAPANESE

Associate Professor: T. Kishimoto; *Assistant Professor:* E. L. Williams; *Lecturers:* M. Shimura, I. Tokunaga

JAPN 101 Elementary Japanese 4(3,1) Course for beginners. Fundamentals are taught, and a foundation is provided for further study and the eventual ability to read and speak the language. The Japanese writing system is introduced. Students learn how to recognize and write the two alphabets Hiragana and Katakana. Three hours a week of classroom instruction and one hour a week in the language laboratory.

JAPN 102 Elementary Japanese 4(3,1) Continuation of JAPN 101. Students study Kanji characters. *Preq:* JAPN 101.

JAPN 201 Intermediate Japanese 3(3,1) Brief review of JAPN 101 and 102, with conversation, composition, and beginning of more serious reading of Japanese in short stories. Students study Kanji characters. *Preq:* JAPN 102.

JAPN 202 Intermediate Japanese 3(3,1) Brief review of JAPN 201, with conversation, composition, and dictation based on more difficult Japanese reading selections; includes a continuation of Kanji characters. *Preq:* JAPN 201.

JAPN 305 Japanese Conversation and Composition 3(3,0) Practice in the spoken language with emphasis on vocabulary, Kanji, pronunciation, and comprehension; learning practical language skills and intercultural communication through various topics. *Preq:* JAPN 202 or consent of department chair.

JAPN 306 Japanese Conversation and Composition 3(3,0) Continuation of JAPN 305. More practice in the spoken language with emphasis on vocabulary, Kanji, pronunciation, and comprehension. Learning practical language skills and intercultural communication through various topics. *Preq:* JAPN 305 or consent of department chair.

JAPN 307 Japanese Civilization I 3(3,0) Study of the significant aspects of the culture of Japan. *Preq:* JAPN 202 or consent of department chair.

JAPN 308 Japanese Civilization II 3(3,0) Study of significant aspects of the culture of Japan. *Preq:* JAPN 202 or consent of department chair.

JAPN 316 Japanese for International Trade I 3(3,0) Spoken and written Japanese common to the Japanese-speaking world of business and industry, with emphasis on business practices and writing and translating business letters and professional reports. Cross-cultural references provide opportunity for comparative and contrastive analysis of American and Japanese cultural patterns in a business setting. *Preq:* JAPN 306 or consent of department chair.

JAPN 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Japanese literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

JAPN 401 Japanese Literature in Translation 3(3,0) Introduction to Japanese literature from 712 A.D. to the present. Cultivates an appreciation for Japanese literature and culture. All readings and discussions are in English. May not be used to satisfy general foreign language requirements.

JAPN 406 Introduction to Japanese Literature 3(3,0) Students read contemporary Japanese narrative fiction, poetry, and drama in their historical and social context. *Preq:* 300-level Japanese course or consent of department chair.

JAPN 411 Studies in the Japanese Language I 3(3,0) Advanced training in the spoken and written language with emphasis on formal expressions. *Preq:* JAPN 306 or consent of department chair.

JAPN 412 Studies in the Japanese Language II 3(3,0) In-depth study of Kanji characters. *Preq:* JAPN 411 or consent of department chair.

JAPN 416 Japanese for International Trade II 3(3,0) Study of language and cultural environment of the Japanese-speaking market, including the linguistic and cultural idioms which support global marketing in general and the international marketing of textiles, agricultural products, and tourism in particular. *Preq:* JAPN 316 or consent of department chair.

JAPN (ANTH) 417 Japanese Culture and Society 3(3,0) Focuses on basic themes in Japanese culture found in social interaction and ritual behavior. Japanese social organization, including marriage and family patterns, neighborhood and community organization, and gender roles receive extensive attention. All readings and discussions in English. May not be used to satisfy general foreign language requirements.

JAPN 491 Senior Seminar in Japanese Literature 3(3,0) Close readings of various works of premodern and modern Japanese literature; study of important authors and their representative works in prose and poetry. Familiarizes students with the cultural and linguistic nuances of literature in the original language. All readings and activities in Japanese. *Preq:* JAPN 306.

JAPN 499 Selected Topics in Japanese Culture 3(3,0) Topic-generated examination of fundamental cultural themes in premodern and modern Japan, including, but not limited to, such topics as Japanese drama, poetry, prose, religious traditions, cinema, and folklore/mythology. May be repeated for a maximum of six credits, but only if different topics are covered. Readings and discussions in English. May not be used to satisfy general foreign language requirements.

LANDSCAPE ARCHITECTURE

Professors: F. E. Chamberlain, D. L. Collins, D. J. Nadenicek, *Chair;* Associate Professor: U. Yilmaz; *Visiting Assistant Professors:* M. P. Dargan, R. R. Hewitt, A. V. Rao; *Lecturers:* R. W. Bainbridge, C. L. K. Martin

LARCH 151 Basic Design I 3(0,6) Studio introduction to design fundamentals through 2D and 3D application of basic systems and development of attitudes essential to the creative design process. *Preq:* Landscape Architecture major. *Coreq:* LARCH 153.

LARCH 152 Basic Design II 3(0,6) Further investigations into design fundamentals through 2D and 3D application of basic systems and development of attitudes essential to the creative design process. *Preq:* LARCH 151. *Coreq:* LARCH 154.

LARCH 153 Landscape Architecture Design Theory I 1(1,0) Lecture course on the underlying theories of design and visual perception that constitute the language of design. Topics include conceptual thinking and problem solving, visual communication, and interaction between design elements and principles. *Preq:* Landscape Architecture major. *Coreq:* LARCH 151.

LARCH 154 Landscape Architecture Design Theory II 1(1,0) Second in a series of lecture courses on the underlying theories of design and visual perception that constitute the language of design and landscape architecture. Topics include light and value perception, color theories, basic perspective systems. *Preq:* LARCH 151, 153. *Coreq:* LARCH 152.

LARCH 251 Basic Design III 6(1,10) Studio focused on design concepts, planning, and project development at the abstract level. Lectures, demonstrations, and exercises support basic landscape architectural design and theory. *Preq:* LARCH 152.

LARCH 252 Basic Design IV 6(1,10) Studio devoted to the methodology of the process. Transition from the abstract to more landscape-specific applications. Lectures, demonstrations, and exercises support basic landscape architectural design and theory. *Preq:* LARCH 251.

LARCH 262 Landscape Architectural Technology I 3(2,2) Introduction to landscape architectural technologies, methods and construction documents including site information gathering and

analysis, elementary problems in site grading and drainage, methods for estimating cut and fill, and principles of stormwater management. Explorations in hand and computer graphic techniques used in construction drawings. *Preq:* BE 221, sophomore standing in design studios.

LARCH 293 Field Studies Internship 1-3(0,3-9) Skill-based practical work experience to give beginning students on-the-job learning opportunities. Requires a minimum of five weeks of uninterrupted, supervised, practical experience with preapproved commercial firm or public agency dealing with landscape architectural site issues. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Preq:* Consent of instructor.

LARCH 351 Landscape Architecture Design Studio I 6(1,10) Studio work with adjunct lectures focused on site-specific design solutions for two or three projects of modest scale. Projects typically involve one property and one use, with an emphasis on published case studies, site analysis, synthesis, and concept development. Introductory experiences in verbal and graphic presentation techniques. *Preq:* LARCH 252.

LARCH 352 Landscape Architecture Design II 6(1,10) Studio work and adjunct lectures featuring problems of greater use complexity than those found in LARCH 351. Projects begin with program and planning issues and proceed to a design resolution. Additional skill building in graphic and oral presentations. *Preq:* LARCH 351.

LARCH 362 Landscape Architectural Technology II 3(2,3) Intermediate course in landscape architecture construction documents and methods including horizontal and vertical alignment of roadways, complex site grading, and storm water management problems. *Preq:* LARCH 262, Junior standing in design studios.

LARCH (A A H) 416 History of Landscape Architecture 3(3,0) See A A H 416.

LARCH 421 Landscape Architectural Seminar 3(3,0) Lectures and seminars dealing with pertinent topics related to environmental, technological, and theoretical issues in landscape architecture, land planning, and urban design. May be repeated for a maximum of six credits. *Preq:* Senior standing or consent of instructor.

LARCH 428 Landscape Architecture Computer-Aided Design 3(2,2) Lecture and lab class which focuses on computer-aided design and drafting using PowerCAD or MiniCAD-Vector programs in alternating years. Students learn how to create landscape architecture illustrative drawings, construction drawings and/or portfolio work in black and white and color. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

LARCH 451 Landscape Architecture Design III 6(1,10) Studio work of substantial scale or complexity such as multiple building complexes, neighborhoods, campus masterplans, research or business parks, or residential communities. Projects may be undertaken on a simultaneous basis to simulate professional practice. Projects may include the integration of computer technologies. Site construction technology issues may be introduced. *Preq:* LARCH 352.

LARCH 452 Landscape Architecture Design IV 6(1,10) Studio focused on projects of substantial scale or complexity. Topics may include public service projects which vary in nature (urban design, town planning, codes and regulations). Emphasis is on professional responsibilities in community service, on-site case study analysis, graphic and verbal communication. *Preq:* LARCH 451.

LARCH 462 Landscape Architectural Technology III 3(2,2) Advanced overview of construction materials and methods used in project implementation. Study characteristics, strengths, nominal sizes and uses of materials (asphalt, brick, concrete, stone, wood). Field trips, exercises, and preparation of construction documents develop understanding of how design ideas are realized in built form. *Preq:* LARCH 362.

LARCH 490 Directed Studies and Projects in Landscape Architecture 1-5(0,3-15) Comprehensive studies and/or research of special topics not covered in other landscape architecture courses. May be repeated for a maximum of ten credits. *Preq:* Consent of instructor.

LARCH H491 Honors Research Methods for Landscape Architecture 1-3(1-3,0) Students investigate various research methodologies in landscape architectural design or related areas and apply to student generated project(s). Students generate a proposal for Landscape Architecture Honors Research. *Preq:* Junior standing; membership in Calhoun Honors College Program, consent of Department Honors Program Advisor.

LARCH 493 Professional Office Internship 1-3(0,3-9) Office experience for advanced students. On-the-job learning requires a minimum of five uninterrupted sequential weeks of employment under the direct supervision of a preapproved registered landscape architect, architect, urban planner, or civil engineer. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Preq:* LARCH 352, 362, consent of instructor.

LARCH H494 Landscape Architecture Honors Research 2-3(2-3,0) Independent, student-generated research on preapproved topic conducted under the supervision and weekly guidance of a faculty member; second in a sequence of three required courses for students enrolled in Departmental Honors Program. Written interim report and presentation to faculty and honors students required before the end of the semester. May be repeated for a maximum of six credits. *Preq:* LARCH H491; membership in Calhoun Honors College Program.

LARCH H495 Landscape Architecture Honors Thesis 2-3(2-3,0) Continuation of independent research, conducted under the supervision and weekly guidance of a faculty member; third in a sequence of three required courses for students enrolled in Departmental Honors Program. Written thesis is submitted and presented before the end of the semester to qualify for Departmental Honors. *Preq:* LARCH H494.

LARCH 551 Landscape Architecture Design V 3(1,10) Studio work and adjunct lectures featuring complex problem-solving projects involving regional design analysis and planning, city planning and urban design, complex building relationships and intense site utilization in an urban setting. Studio may be taken in Charleston, Genoa, or Barcelona. *Preq:* LARCH 452.

LARCH 552 Landscape Architecture Design VI 6(0,14) Studio work on student-selected professional level exit project including design-build project or substantive research project. Exit studio synthesizes and builds on skills developed throughout the Landscape Architecture program. Also provides opportunities for students to inquire into areas of interest not otherwise covered. *Preq:* LARCH 452.

LARCH 562 Landscape Architectural Technology IV 2(0,4) Studio course for the integration of design and technology. *Preq:* LARCH 462, professional standing. *Coreq:* LARCH 552.

LARCH 581 Landscape Architectural Professional Practice 3(3,0) Lecture course dealing with general consideration of landscape architectural office procedures. Study of the professional relationships of the landscape architects to client and contractor including problems of ethics, law, and business. *Preq:* Professional standing or consent of instructor.

LANGUAGE

LANG (PO SC) 350 Seminar in International News 3(3,0) Review of current news of significance for the world and for U.S. foreign policy through authentic sources such as foreign newspaper, television/radio broadcasts, and the internet. Student-led discussions in the target language groups (i.e. French, German, Spanish) are supplemented by joint debates in English from global perspectives. May be repeated for a maximum of six credits. *Preq:* FR 202, GER 202, SPAN 202, or consent of department chair.

LANG 371 Language and Culture 3(3,0) Surveys key topics, theories, and methodological approaches in linguistic anthropology; examines the complex relationships among language, culture, and communicative behavior; and provides students with conceptual tools that inform the study of language in its cultural contexts.

LANG (COMM) 400, 600 Phonetics 3(3,0) Study of basic phonetic concepts used in the study of sounds in language.

LANG 401 China Study Abroad 3(3,0) Six-week intensive summer course on Chinese culture offered in China. Main topics include origin and history of Chinese language, Chinese nationalities, geography, architecture, arts, and social custom. All readings and discussions are in English. May be repeated for a maximum of six credits.

LANG 420, H420 France and the Francophone World 3(3,0) Selected masterpieces of French and Francophone Culture are considered within their historical and cultural context. All readings and instruction are in English. No knowledge of the foreign language is required. May be repeated for a maximum of six credits. *Preq:* Sophomore standing or consent of department chair.

LANG (ENGL) 454 Selected Topics in International Film 3(2,3) Presents subtitled films of specific world cultures and basic film theory and discourse applicable to the selected areas. Taught in English. May be repeated for a maximum of six credits with consent of department chair. *Preq:* ENGL 310 or consent of instructor.

LANG 455 Hispanic Film: Documentary and Feature 3(3,0) Overview of theory and discourse on Hispanic film. Through lectures, discussions, and films, students become acquainted with film as a vehicle for understanding the Hispanic World. Taught in English. Films are in Spanish with English subtitles. *Preq:* Sophomore standing or consent of department chair.

LANGUAGE AND INTERNATIONAL TRADE

Professors: J. C. Bednar, P. R. Heinskjeld, *Interim Director*, S. C. King, C. K. Nakuma, *Chair*; *Associate Professor:* T. Kishimoto; *Assistant Professors:* J. Schmidt, M. M. Rojas-Massei, G. E. Tissera, Z. Zhang; *Lecturer:* L. J. Ferrell

L&IT 127 Introduction to Language and International Trade 1(1,0) Survey of the nature of international trade and related career opportunities. Information and applications of specific relevance to tourism, agriculture, and textile industries are offered. To be taken Pass/Fail only.

L&IT 400 Language and International Trade Internship 1-3 One-semester, full-time (or equivalent part-time) work assignment which provides the opportunity for students to extend theoretical classroom learning through work experience in an appropriate setting. A final report is required. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Preq:* FR 316, GER 316, or SPAN 316; 12 semester hours in a Language and International Trade technical option.

L&IT 401 Language and International Trade Practicum 1-3 Foreign language experience such as an approved study abroad program which provides the student with the opportunity to apply theoretical classroom learning to a foreign language experience in an appropriate setting. To be taken Pass/Fail only. *Preq:* FR 316, GER 316, or SPAN 316; six credits in language.

L&IT 402 Language and International Trade Directed Study 3 Directed study of an individual project in language and international trade. To be taken Pass/Fail only.

LATIN

LATIN 101 Elementary Latin 4(4,0) Course for beginners designed principally to teach the reading of the language.

LATIN 102 Elementary Latin 4(4,0) Continuation of LATIN 101.

LATIN 201 Intermediate Latin 3(3,0) Review of the fundamental principles of grammar in conjunction with readings from the Classical period. *Preq:* LATIN 102 or equivalent.

LATIN 202 Intermediate Latin 3(3,0) Continuation of LATIN 201 with the introduction of writings from the late Latin and Medieval periods. *Preq:* LATIN 201 or equivalent.

LAW

Associate Professor: E. L. Edwards; *Assistant Professors:* M. E. Mowrey, V. L. S. Ward-Vaughn; *Lecturer:* J. R. Jahn

LAW 312 Commercial Law 3(3,0) Introduction to business law with primary attention given to contracts, agency, and negotiable instruments. *Preq:* Junior standing.

LAW 313 Commercial Law 3(3,0) Continuation of LAW 312 with emphasis on business organizations, personal and real property, estates and bankruptcy, sales and secured transactions. *Preq:* LAW 312 or consent of instructor.

LAW 322, H322 Legal Environment of Business 3(3,0) Examination of both state and national regulation of business. Attention is given to the constitution and limitations of power, specific areas in which governments have acted, and the regulations that have been imposed in these areas. *Preq:* Junior standing.

LAW 333 Real Estate Law 3(3,0) The nature of real property and means of acquiring rights therein: conveyance of ownership, creation and execution of deeds, mortgages, etc., landlord and tenant relationships, shared concepts, and government regulation.

LAW 399 Internship in Legal Studies 1-3 Faculty-supervised legal internship to give students learning opportunities that support their classroom experiences. Requires a minimum of six full-time weeks. Course enrollment and internship must occur in the same semester. Simultaneous credit cannot be received for another internship offering. May be repeated for a maximum of three credits. To be taken Pass/Fail only. *Preq:* Junior standing or consent of instructor.

LAW 405, 605 Construction Law 3(3,0) Provides a practical knowledge of legal principles applied to the construction process and legal problems likely to be encountered by practicing construction professionals. Topics include construction contracting, liability, claims and warranties, documentation, and responsibility and authority of contracting parties. *Preq:* LAW 312 or 322 or consent of instructor.

LAW 420, 620 International Business Law 3(3,0) Intensive examination of the historical background of modern public and private international law; selected issues of public international law—human rights, law of war, United Nations' system, and international litigation; selected issues of private international law—international sales, international trade, and formation and operation of multinational businesses. *Preq:* LAW 312 or 322 or consent of instructor.

LAW 499 Selected Topics 1-3(1-3,0) In-depth examination of timely topics in legal studies. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing and consent of instructor.

LEISURE SKILLS

Professor: J. R. Pope, Jr. *Assistant Professor:* M. H. Wynn; *Lecturer:* B. W. Stevens

- L S 100 Selected Topics 1(0,3)** Presentation of leisure skills not covered in other courses. May be repeated for a maximum of three credits, but only if different topics are covered.
- L S 101 Challenge Recreation Activities 1(1,0)** Encourages students to broaden their leisure skills and improve self-image through challenge activities. Classroom instruction stresses how to get started safely in flying, scuba, canoeing, skiing, windsurfing, mountaineering, hang-glider, ballooning, and other challenge activities.
- L S 111 Lapidary Arts 1(0,3)** Students learn the techniques used to transform raw materials such as gemstones, minerals, gold, and silver into objects of art—primarily jewelry.
- L S 125 Budget Travel 1(0,3)** Teaches the necessary skills to travel internationally on a budget. Students learn how to get the best airfares, research destinations, and build an itinerary. Packing, security, local transportation, and culture/reverse-culture shock are also discussed.
- L S 141 Top Rope Climbing 1(0,3)** Basic rock climbing skills, including philosophy, safety, knots, climbing techniques, site and supplies selection, and nature/conservation issues are covered.
- L S 145 Camping and Backpacking 1(0,3)** Basic camping and backpacking skills including map and compass reading, outdoor cooking, camping hazards and safety, site selections, and trip planning.
- L S 147 Alpine Skiing 1(0,3)** Basic downhill snow skiing instruction including equipment selection, safety, and maintenance; parallel turns; edging; carved and linked turns; wedeling; and safety and etiquette. There is an additional fee for this course. Taught during Christmas recess. (Contact the Department of Parks, Recreation, and Tourism Management in October.)
- L S 149 Snowboarding 1(0,1)** Basic snowboarding instruction including equipment selection; safety; conditioning; and skills such as stopping, techniques for turning, and riding lifts. There is an additional fee for this course. Taught during the Christmas recess. (Contact the Department of Parks, Recreation, and Tourism Management in October.) May not be taken concurrently with L S 147 or 347.
- L S 159 Hunting Traditions 1(0,3)** Basic, hands-on instruction in the shooting sports (shotgun, rifle, and archery) and the sport of hunting. Designed to introduce students to the safe and responsible use of firearms and archery equipment and safe hunting practices. Students are required to complete the SC Department of Natural Resources Hunter Education certification.
- L S 164 Whitewater Kayaking 1(0,3)** Flat-water and whitewater skills, techniques, safety, rescue, equipment selection and maintenance, and selection of routes/trips to participate in basic whitewater kayaking. *Preq:* Basic swimming skills.
- L S 165 Inland Kayak Touring 1(0,3)** Introductory course which teaches the basic skills necessary to safely enjoy flatwater (non-tidal waters: lakes, slow moving rivers) kayak touring. Students learn equipment selection, strokes, safety, and rescue techniques. *Preq:* Demonstrated swimming competence.

- L S 167 Canoeing 1(0,3)** Basic instruction in the nomenclature, strokes, and safety techniques in canoeing. *Preq:* Basic swimming skills.
- L S 169 Sailing 1(0,1)** Basic instruction in the nomenclature, safety and rescue techniques, and skills required to skipper sailing craft. *Preq:* Basic swimming skills.
- L S 171 Windsurfing 1(0,3)** Basic windsurfing instruction including rigging, launching, tacking, jibbing, rig and foot steering, safety, maintenance, equipment selection, rules-of-the-road, and racing techniques are covered. Offered Fall Break and first summer session. There is an extra fee for this course. *Preq:* Ability to swim 300 yards and tread water for five minutes.
- L S 175 Fly Fishing 1(0,3)** Introductory course in the techniques of fly-fishing. Students learn casting, fly-tying, and equipment selection.
- L S 179 Scuba I 1(0,3)** Students are taught basic open water diving techniques and are prepared to complete the requirements for the open water diving certification. Certifications are granted by an internationally recognized and accepted certifying agency. *Preq:* Swim test required by certifying agency.
- L S 185 Bowling 1(0,3)** Basic instructional program on techniques of bowling.
- L S 189 Tennis 1(0,3)** Fundamental course stressing rules, strokes, and strategy, with ample opportunity for practice.
- L S 194 Racquetball 1(0,3)** Basic skills, knowledge of rules, strategy, and basic strokes.
- L S 198 Golf 1(0,3)** Fundamental course stressing rules, strategy, and basic strokes.
- L S 210 Learn to Dance 1(0,2)** Students develop an understanding of the qualities of dance, recognize the importance of dance as a leisure pursuit, and learn to dance to difference types of music. Dances include shag, waltz, cha-cha, foxtrot, as well as current dance trends.
- L S 214 Modern Dance 1(0,3)** Introduction to modern dance techniques with emphasis on developing the style of movement and understanding the dance art form.
- L S 218 Ballroom Dance 1(0,2)** Students develop an understanding of advanced dance methods, learn about dance at social and competitive levels, and increase knowledge of a variety of both smooth and Latin steps. Dances include tango, cha-cha, waltz, fox-trot and swing.
- L S 220 Shag 1(0,2)** Students develop an understanding of the South Carolina state dance, its history and impact on the state. Students learn more advanced steps in shag, including bellyroll, sugarfoot, slide step, tiptoe up the ladder, pivot, and the thirteen steps.
- L S 233 Aerobic Dance 1(0,3)** Instruction in the development of skills for the safe improvement and maintenance of cardiovascular fitness, flexibility, and muscle tone utilizing dance movements and techniques.
- L S 235 Basic Yoga 1(0,3)** Develops flexibility, strength, sensitivity, energy, and a sense of relaxation through the study of basic yoga postures, conscious breathing, and meditation techniques.

- L S 236 Power/Ashtanga Yoga 1(0,3)** Power/Ashtanga Yoga is a comprehensive workout based on the Eastern philosophy of K. Pattabhi. Students learn the eight limbs of this philosophy and the rigorous series of postures that produce a high power, athletic workout with the purpose of detoxifying impurities in the body.
- L S 237 Kripalu Yoga 1(0,3)** Great emphasis is placed on learning breath work techniques to combine directly with the various kripalu yoga postures. The goal is to teach individuals the physiological reactions produced by this type of yoga in developing and restoring health.
- L S 270 Sports Officiating 1(0,3)** Practical study of officiating for various sports. Includes studies and practical application of officiating rules and mechanics. Sports studied include football, basketball, softball, soccer, and introductions to a variety of other team sports.
- L S 347 Advanced Alpine Skiing 1(0,3)** Advanced downhill snow skiing instruction in such techniques as mogul skiing, check turns, free-style, and racing. There is an additional fee for course. Taught over Christmas break. Credit is awarded for spring semester. (Contact Department of Parks, Recreation, and Tourism Management in October.) *Preq:* L S 147 or consent of instructor.

MANAGEMENT

Professors: N. Balakrishnan, R. S. Cantrell, M. D. Crino, J. S. Davis, D. W. Grigsby, V. Grover, R. L. LaForge, T. L. Leap, *Chair:* M. A. McKnew, J. W. Patterson, P. L. Roth, V. Sridharan, C. S. St. John; *Associate Professors:* R. L. Clarke, L. D. Fredendall, J. Miller, R. L. Purvis, T. L. Robbins, W. H. Stewart, Jr., T. P. Summers; *Assistant Professors:* T. J. Douglas, R. M. Henry, R. Klein, M. L. Loughry, J. B. Thatcher; *Lecturers:* J. T. Churan, T. B. Huneycutt, K. A. Kegley, J. I. McKnew, G. L. Newkirk, S. E. Stasiukaitis

- MGT 120 Collaborative Management 3(2,2)** Provides a model for successfully working with persons from the marketing, operations, accounting/finance, and engineering functions. Students operate on a cross-functional team and explore concepts and tasks associated with managing effectively for high performance. *Preq:* Pre-Business major, ECON 211, consent of the instructor.
- MGT 218, H218 Management Personal Computer Applications 3(0,6)** Personal computer applications that support managers. Students learn from hands-on work rather than lecture. To be taken Pass/Fail only. *Preq:* CP SC 120 or consent of instructor.
- MGT 301, H301 Principles of Management 3(3,0)** Management's role as a factor of economic production. Functions of management, principles of organization, and behavior in organizations.
- MGT 305 Economics of Transportation 3(3,0)** Topics include history and structure of transportation systems in the United States, the nature of transportation costs and rates, transportation systems as factors in industrial location, transportation policy, and transportation's role in national security. *Preq:* Junior standing.
- MGT (ECON) 306 Managerial Economics 3(3,0)** See ECON 306.

MGT 307, H307 Personnel Management 3(3,0) Principles, concepts, and techniques concerned with effective and efficient utilization of personnel. Emphasis is on motivation, leadership, and human behavior related to employer-employee relations. Topics include personnel recruitment, classification, selection, training, development, and performance evaluation. *Preq:* Junior standing; one of the following: MTHSC 203, 301, 302, EX ST 301.

MGT 310, H310 Intermediate Business Statistics 3(3,0) Quantitative methods of the management scientist with applications to business and industrial problems. Topics include regression analysis, correlation analysis, analysis of variance, sampling, and nonparametric methods. Credit toward a degree will be given for only one of MGT 310 or EX ST 311. *Preq:* EX ST 301 or MTHSC 301.

MGT 312, H312 Decision Models for Management 3(3,0) Exploration of ways in which management science decision models can help in making sound managerial decisions. Problem solving is Excel-based. Topics include linear programming, project scheduling, and simulation.

MGT (E L E) 315 New Venture Creation II 3(3,0) Second of a two part series examining entrepreneurship. Using opportunity analysis developed in MKT (E L E) 314, course focuses on designing and managing an organization capable of effectively pursuing the opportunity. Topics include organization strategy and design, start-up capital, operations and sourcing issues, leadership, team building, and management of rapid growth. *Preq:* MKT (E L E) 314.

MGT 317 Logistics Management 3(3,0) Management of physical distribution and supply systems with emphasis on design concepts, cost determinants, and control. *Preq:* Junior standing.

MGT 390 Operations Management 3(3,0) Examines the role of operations management in both manufacturing and service organizations. Discusses the concepts, tools, and techniques for managing the operations function. Topics include operations strategy, design, planning, and control. *Preq:* MTHSC 301 or equivalent.

MGT 400 Management of Organizational Behavior 3(3,0) Provides management students with a framework for understanding how behavior within business organizations is managed. Particular emphasis is on integrating management theory with recent developments in the behavioral sciences with distinct management applications. Theory, research, and business applications are considered. *Preq:* MGT 301 with a C or better.

MGT 402, H402 Operations Planning and Control 3(3,0) Managing, planning, and controlling production and service operations with emphasis on demand forecasting, aggregate planning, production scheduling, and inventory management. *Preq:* MGT 310, 312, 390.

MGT 403 Special Problems 1-3(1-3,0) Planning, developing, and executing a research project related to the field of management and defense studies. May be repeated for a maximum of six credits. *Preq:* Senior standing in Industrial Management or Management, consent of instructor.

MGT 404 Advanced Statistical Quality Control 3(3,0) Statistical quality control techniques as applied to all areas of quality control: process control, process capability, acceptance sampling, and economic aspects of quality decisions. *Preq:* MGT 310, 390.

MGT 408 Design of Production Systems 3(3,0) Examines the design of systems for production and delivery of goods and services. Emphasizes the impact of alternative designs on the competitive posture of the firm. Discusses the concepts, tools, and techniques for designing facilities and jobs and systems for continuous performance improvement. *Preq:* MGT 310, 312, 390.

MGT 411 Project Management 3(3,0) Examination and application of the project management body of knowledge. This consists of theory, tools, and techniques to organize, plan, and control individuals, teams, quality, and operations while conducting a project. *Preq:* EX ST 301 or MTHSC 301 or equivalent.

MGT 414 Statistical Analysis 3(3,0) Application of statistics in management decision making. Emphasis is on the proper design, analysis, and interpretation of planned experiments. Topics include single factor through fractional factorial experiments. *Preq:* MGT 310 or equivalent.

MGT 415, H415 Business Strategy 3(3,0) Capstone course for seniors. Various methods are used in analyzing complex business problems, requiring students to integrate their knowledge of all areas of business. Student participation and written and oral communications are stressed. *Preq:* FIN 306 or 311; MGT 301; MKT 301; Senior standing.

MGT 416 Management of Human Resources 3(3,0) Recent developments in the management of human resources with emphasis on results of research into the motivation, development of potential, and full utilization of the human resources. *Preq:* MGT 307 and 400 with a C or better; consent of instructor.

MGT 418 Management Information Systems 3(3,0) Use of data processing concepts as an aid in implementing managerial functions. Electronic data processing terminology, software, hardware, computer operations and techniques, systems analysis, and the principles of management information systems design and implementation are emphasized. *Preq:* MGT 218 or consent of instructor.

MGT 422 Small Business Management 3(3,0) Study of the management of the small independently owned and operated business. Emphasis is on analyzing new business opportunities, planning and establishing a growing concern, and managing the contemporary small business. Field experience in consulting with small businesses enhances students' understanding of the unique opportunities and problems of small business organizations. *Preq:* MKT 301 or consent of instructor.

MGT 423 International Business Management 3(3,0) Survey of theoretical and institutional complexities of international business operations. Topics include exporting, importing, foreign investment, multinational corporations, and international payment system. *Preq:* Junior standing.

MGT 424 International Transportation and Logistics 3(3,0) Examination and analysis of international transportation systems and their logistics support systems. Topics include ocean shipping, international air transportation, port management, and EEC and Soviet-block transport systems. International transport legislation and policies are also analyzed. *Preq:* Senior standing or consent of instructor.

MGT 425 Compensation Management 3(3,0) Examination of compensation employees seek in exchange for their efforts and contributions. Topics include government and union influences; job content analysis, description, and evaluation; developing pay structures; measuring and paying for performance; employee benefits; administration of the compensation plan; executive, managerial, professional, and sales. *Preq:* MGT 307, 400 with a C or better.

MGT 426 Industrial Traffic Management 3(3,0) Surveys the responsibilities and functions of industrial traffic management in manufacturing and distribution. Emphasis is on the role of the industrial traffic manager in optimizing the logistics system of the firm (i.e., the materials management of its inbound supplies and the distribution of its finished products). *Preq:* MGT 305 or 317.

MGT 427 Managing Continuous Improvement 3(3,0) Examination of issues related to continuous improvement, including a systematic approach to selecting improvement areas, determining how to improve, plan, and manage the improvement process. Topics include selecting performance measurements, using teams to achieve breakthrough change, identifying root causes of problems, and developing and implementing solutions to problems. *Preq:* MGT 390 or consent of instructor.

MGT 430 Senior Seminar in Management 3(3,0) In-depth study of current business topics; allows senior Management students the opportunity to relate their academic studies to real-world problems. A senior paper is required. *Preq:* Senior standing.

MGT 431 Employee Diversity, Rights, and Responsibilities 3(3,0) Focuses on employee and organizational rights and responsibilities. Topics include various types of discrimination (race, sex, religious, national origin, age, and disability status); drug and alcohol testing; AIDS in the workplace; employee discipline and termination issues; privacy and safety concerns; and union organizing campaigns. *Preq:* MGT 307, 400 with a C or better.

MGT 435 Personnel Interviewing 3(3,0) Helps students understand current interviewing theory, conduct an employment interview, and advise their future employers how to improve interviewing programs. Topics include job analysis, legal issues, types of interviews, and evaluating applicants. *Preq:* MGT 307 and 400 with a C or better.

MGT (I E) 444 International Perspectives in Industrial Management 3-6(3-6,0) Provides an international perspective to industrial management via organized plant visitations to businesses in a foreign country and lectures by and discussions with senior operations managers. Cultural visits and lectures are also organized to provide a holistic perspective to cover cultural and economic environment of the host country. Students are responsible for travel costs. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

MGT 452 Systems Analysis and Design 3(3,0) Follows the traditional systems development life cycle (SDLC), although alternative methodologies are also discussed. Focuses on earlier phases of the SDLC, from IS planning through specification of structured requirements and on the methods, techniques, and tools used to determine information requirements and their unambiguous documentation. *Preq:* Junior standing.

MGT 454 Systems Implementation 3(3,0) Builds upon skills of programming, database, and systems analysis and design by involving students with the later phases of the systems development life cycle (SDLC). Students design and develop a system using various platforms. Focus is on the logical and physical system design. *Preq:* CPSC 462 or equivalent, MGT 452.

MGT 455 Emerging Information Technology Trends in Business 3(3,0) In-depth study, through case studies, readings, and hands-on experience of emerging information technologies in and across business organizations. Focus is on the understanding, effective deployment, and impact of these technologies on business outcomes. *Preq:* Junior standing.

MGT 456 Decision Support Systems 3(3,0) In-depth study, through case studies, readings, and hands-on experience, of decision support systems and related knowledge-based technologies. Focus is on organizational decision making and its data, information, and knowledge-based support systems. *Preq:* Junior standing.

MGT 490 Selected Topics in Industrial Management 3(3,0) In-depth examination of advanced topics in Industrial Management. Topics may vary in keeping with developments in the management profession and interests of faculty. Emphasis is on the application of these topics to the production and operations management environment. *Preq:* MGT 402 or 404 or 408.

MARKETING

Professors: L. Carlson, C. R. Duke, S. J. Grove, W. E. Kilbourne, G. M. Pickett, *Chair*; R. M. Reese; *Associate Professors:* M. J. Dorsch, R. Gomes, P. A. Knowles, M. C. LaForge, J. D. Mittelstaedt, J. N. Moore, M. A. Raymond; *Assistant Professor:* C. Hopkins; *Lecturer:* J. G. Gaubert

MKT 301, H301 Principles of Marketing 3(3,0) Principles and concepts involved in planning, pricing, promoting, and distributing of goods and services. *Preq:* ECON 200 or 211 or 212; 45 credit hours completed.

MKT 302 Consumer Behavior 3(3,0) Examination of selected individual and group behavioral science concepts and their application to the understanding of consumer decision making. *Preq:* MKT 301.

MKT (E L E) 314 New Venture Creation I 3(3,0) Assessing entrepreneurial opportunities. First in a two-part series with MGT (E L E) 315. Focuses on creativity, idea generation, market opportunity analysis, strategy, and methods of entry. Opportunity analysis may be developed into a full new venture plan in MGT (E L E) 315. *Preq:* Junior standing.

MKT 321 Sports Marketing 3(3,0) Exploration of the essentials of effective sports marketing. Topics include application of marketing principles in the sports area, licensing issues, sponsorships and endorsements, stadium and arena marketing, broadcasting and media considerations, public policy and sports, and unique marketing challenges for sport specific products (football, basketball, baseball, motorsports, etc.). *Preq:* MKT 301 or consent of instructor.

MKT 399 Marketing Internship 3(0,9) Pre-planned, preapproved, faculty-supervised marketing internships. Credit will only be given for internships of at least ten full-time, consecutive weeks with the same internship provider. Restricted to students with a major or minor in Marketing. To be taken Pass/Fail only. *Preq:* MKT 301 and consent of instructor.

MKT 420 Professional Selling 3(3,0) Current theories about the selling of goods and services to organizational buyers in the context of long-term relationships. Role playing, video-taped presentations, and other techniques are generally employed to enhance interpersonal communication skills. *Preq:* Junior standing, MKT 301.

MKT 423, 623 Promotional Strategy 3(3,0) Emphasis is on promotion as the communication function of marketing. Attention is given to communication theory and promotion's relation to mass and interpersonal communication. Factors affecting the promotional decision-making process are explored, and promotion as a competitive tool is examined. *Preq:* MKT 301 or consent of instructor.

MKT 424 Sales Management 3(3,0) Comprehensive examination of the planning, implementation, and control of professional sales organizations. *Preq:* MKT 301 or consent of instructor.

MKT 425 Retail Management 3(3,0) Retailing is studied from a decision-making approach. Topics include target market analysis, location analysis, merchandising, human resources, pricing and promotion. *Preq:* MKT 301 or consent of instructor.

MKT 426 Business-to-Business Marketing 3(3,0) Study and analysis of the unique aspects of marketing goods and services to organizational buyers rather than household consumers. Emphasis is on developing strategic responses to market opportunities given competitive behavior. *Preq:* MKT 301 or consent of instructor.

MKT 427, 627 International Marketing 3(3,0) Study of marketing from the international point of view. Emphasis is on the necessary modification of marketing thinking and practice for foreign markets due to individual environmental differences. *Preq:* MKT 301.

MKT 428, 628 Services Marketing 3(3,0) Exploration and study of the nature of service organizations and the principles which guide the marketing of their products. Emphasis is on a marketing mix that is fundamentally different than that found in traditional goods marketing. *Preq:* MKT 301 or consent of instructor.

MKT 429, 629 Public and Nonprofit Marketing 3(3,0) Examines the role and application of marketing in public and nonprofit settings. Focuses on a conceptual understanding of the marketing discipline and marketing processes and shows how basic concepts and principles of marketing are applicable to public and nonprofit organizations. *Preq:* MKT 301 or consent of instructor.

MKT 430, 630 Marketing Product Management 3(3,0) Management of the firm's product or service offerings. Topics include new product screening, evaluation, and development; product line and mix analysis; abandonment decisions; brand manager's role; new product development department, and others. Emphasis is on decision making. *Preq:* MGT 310, MKT 301; or consent of instructor.

MKT 431, 631 Marketing Research 3(3,0) Research used in marketing decision making. Primary emphasis is on methods and techniques used in planning, collection, processing, and utilization of information. Topics include research design, sources of information, questionnaire design, sampling, data collection, and data analysis. *Preq:* MGT 310, MKT 301, MTHSC 301; or consent of instructor.

MKT 433 Sport Marketing Strategy 3(3,0) Provides students with basic knowledge about brand management as it applies to sport. Addresses basic principles and guiding precepts of how sport-based organizations build strong brands. *Preq:* MKT 321 or consent of instructor.

MKT 434 Sport Promotion 3(3,0) Emphasizes the promotional function of sport. Topics include event sponsorship, developing media relationships, endorsements, promotion objective setting and budgeting, media planning and scheduling, and utilizing the tools of promotion within a sport context. Integrated Marketing Communication provides the theoretical and managerial framework for how these factors are utilized optimally. *Preq:* MKT 321, 423.

MKT 435 International Sport Marketing 3(3,0) Provides working knowledge of international sport marketing. Consists of lecture and site visits. Topics include brief history of sport, sport marketing basics, building sport brands, sport strategies, and issues facing the new sporting goods industry. *Preq:* MKT 301.

MKT 450 Strategic Marketing Management 3(3,0) Application of marketing constructs in the analysis and solution of marketing problems. Emphasis is placed on information systems, data analysis, and critical-thinking skills in solving marketing problems in a wide range of managerial decision areas including, but not limited to, new product development, pricing, advertising, personal selling, channels, and international marketing. *Preq:* MKT 301, six hours of 400-level marketing courses.

MKT 495, 695 Selected Topics 3(3,0) In-depth examination of timely topics in marketing. May be repeated for credit, but only if different topics are covered. *Preq:* MKT 301 or consent of instructor.

MKT 499 Independent Study 1-3(1-3,0) Directed readings or independent research in selected marketing areas. Topics must be selected and proposed by student. Proposals must be approved by instructor. May be repeated for a maximum of three credits. *Preq:* MKT 301 and consent of instructor.

MATHEMATICAL SCIENCES

Professors: W. P. Adams, J. R. Brannan, J. V. Bradley, Jr., P. M. Dearing, V. J. Ervin, R. E. Fennell, S. Gao, R. E. Jamison, J. P. Jarvis, J. D. Key, M. M. Kostreva, K. B. Kulasekera, R. C. Laskar, R. Lund, W. F. Moss III, J. A. Reneke, D. R. Shier, R. L. Taylor, D. D. Warner, M. M. Wiecek; *Associate Professors:* N. J. Calkin, C. L. Cox, S. L. Ganter, P. C. Kiessler, H. K. Lee, J. K. Peterson, C. B. Russell, M. J. Salzman, H. F. Senter, C. L. Williams; *Assistant Professors:* C. M. Gallagher, J. Hoffacker, P. D. Hyden, K. L. James, E. W. Jenkins, T. R. Khan, H. Maharaj, G. L. Matthews, C. Park; *Lecturers:* K. R. Andrighetti, S. S. Biggers, K. M. Bunnell, M. E. Cawood, N. J. Conway, J. Cottingham, S. L. Crawford, R. E. Davidson, C. A. Davis, J. M. Flatt, P. F. Garner, M. L. Hanna, T. A. Johnson, J. M. LaVare, A. J. Lynn, J. K. Martin, T. F. Parrott, S. A. Prevost, M. Reba, M. Rios-Adams, D. M. Simms, W. B. Staufenberg, A. K. Stoddard, S. E. Walker; *Visiting Professors:* J. D. Fulton, M. E. Hammett, W. J. Padgett; *Visiting Associate Professor:* D. M. Fairbairn; *Visiting Assistant Professors:* J. B. Lassiter, B. A. Novick, I. V. Viktorova

MTHSC 101 Introduction to Probability 3(3,0) Introductory study of randomness and probability. Major topics include descriptive techniques for data, basic probability concepts, permutations and combinations, discrete distributions, normal and uniform distributions, sampling distributions and the central limit theorem. *Prq:* Satisfactory score on the Clemson Mathematics Placement Test or consent of department.

MTHSC 102 Introduction to Mathematical Analysis 3(3,0) Intuitive approach to the concepts and applications of calculus. Topics include functions and graphing, differentiation, and integration. Applications from social, biological, and management sciences are presented. Not open to those receiving credit for MTHSC 106. *Prq:* Satisfactory score on the Clemson Mathematics Placement Test or consent of department.

MTHSC 103 Elementary Functions 3(3,1) Gateway course for MTHSC 106. Comprehensive treatment of functions and analytic geometry with applications including polynomial, rational, algebraic, exponential, logarithmic, and trigonometric functions. Not open to students who have passed MTHSC 105. *Prq:* MTHSC 104 or satisfactory score on the Clemson Mathematics Placement Test.

MTHSC 104 College Algebra 3(3,1) Basic course to prepare students for subsequent courses in probability, mathematical analysis, elementary statistics, and elementary functions (precalculus). Fundamental concepts of algebra, equations, inequalities, functions, and graphs are studied. Students who have received credit for any other mathematical sciences course will not be allowed to enroll in or receive credit for MTHSC 104.

MTHSC 105 Precalculus 5(5,1) Extensive treatment of topics chosen to prepare students for the study of calculus. Special emphasis is given to polynomial, rational, exponential, logarithmic, and trigonometric functions and their graphs, as well as basic and analytic trigonometry. Students who have received credit for any other mathematical sciences course will not be allowed to enroll in or receive credit for MTHSC 105.

MTHSC 106, H106 Calculus of One Variable I 4(4,0) Topics include analytic geometry, introduction to derivatives, computation and application of derivatives, integrals, exponential and logarithm functions. *Prq:* MTHSC 103 or 105 or satisfactory score on the Clemson Mathematics Placement Test or consent of department.

MTHSC 107 Co-Calculus I 1(0,2) Recitation style course to accompany MTHSC 106. Reinforces precalculus and calculus topics covered in MTHSC 106 and provides additional instruction and practice for students. Required of students identified by the Clemson Mathematics Placement Test as being conditionally qualified for placement in calculus with supplemental instruction. To be taken Pass/Fail only. *Prq:* Concurrent enrollment in MTHSC 106.

MTHSC 108, H108 Calculus of One Variable II 4(4,0) Topics include infinite series, limits, differentiation and techniques of integration. *Prq:* MTHSC 106.

MTHSC 109 Co-Calculus II 1(0,2) Recitation style course to accompany MTHSC 108. Reinforces precalculus and calculus topics covered in MTHSC 108 and provides additional instruction and practice. Recommendations are made to students based on their scores on a Calculus Basic Skills Quiz, given at the beginning of each semester. *Prq:* Concurrent enrollment in MTHSC 108.

MTHSC 115 Contemporary Mathematics for Elementary School Teachers I 3(3,0) Cooperative learning groups, manipulatives, and concrete models are used to demonstrate logical reasoning, problem-solving strategies, sets and their operations, numeration systems, properties and operations of whole numbers, number theory, prime and composite numbers, divisibility, common factors and multiples. Open to Elementary, Early Childhood, and Special Education majors only. *Prq:* MTHSC 104 or satisfactory score on the Clemson Mathematics Placement Test.

MTHSC 116 Contemporary Mathematics for Elementary School Teachers II 3(3,0) Continuation of MTHSC 115. Manipulatives and concrete models are used for properties, operations, and problem solving for integers, elementary fractions, rational numbers, and real numbers. Selected topics in statistics and probability are introduced with a hands-on approach to learning. Restricted to Elementary, Early Childhood, and Special Education majors. *Prq:* MTHSC 115 or consent of instructor.

MTHSC 117 Mathematics for Elementary School Teachers I 4(4,0) Problem-solving strategies, logic, algebraic thinking, sets, relations, functions, numeration systems, whole numbers, integers, number theory, fractions, decimals, applications of percent, real numbers with their computational algorithms and properties are explored. The content, according to the state standards, is taught with appropriate methodology for teaching K-8. Open to Elementary, Early Childhood, and Special Education majors only. *Prq:* satisfactory score on Clemson Mathematics Placement Test or MTHSC 104.

MTHSC 118 Mathematics for Elementary School Teachers II 4(4,0) Two- and three-dimensional geometry including polygons, polyhedra, and their properties; congruence, similarity, construction, coordinate plane; standard measurement, area, surface area, volume; transformations, symmetries; and simple probability and descriptive statistics are explored. The content, according to the state standards, taught with appropriate methodology for teaching K-8. Open to Elementary, Early Childhood, and Special Education majors only. *Prq:* MTHSC 117 or consent of instructor.

MTHSC 119 Introduction to Discrete Methods 3(3,0) Topics normally include elementary logic and methods of proof; sets, functions, and relations; graphs and trees; combinatorial circuits and Boolean Algebra. *Prq:* Satisfactory score on the Clemson Mathematics Placement Test or consent of department.

MTHSC 129 Problem Solving in Discrete Mathematics 3(2,2) Problem-solving approach to learning mathematics is applied to topics in modern discrete mathematics. Typical selection of topics includes logic and proof, sets, relations, functions, mathematical induction, graphs and trees, counting techniques, recurrence equations. For Bachelor of Science and Bachelor of Arts majors in Mathematical Sciences only. Credit may not be received for both MTHSC 119 and 129. *Prq:* MTHSC 106.

MTHSC 203 Elementary Statistical Inference 3(3,0) Survey course in fundamental statistical principles with applications. Topics include estimation, tests of hypotheses, simple linear regression and correlation, analysis of count data, and nonparametric statistics. May not be taken for credit by students who have passed MTHSC 301, 302, 309, or EX ST 301. *Prq:* MTHSC 101.

MTHSC 206, H206 Calculus of Several Variables 4(4,0) Topics include real valued functions of several variables, multiple integration, differential calculus of functions of several variables, vector field theory. *Prq:* MTHSC 108.

MTHSC 207 Multivariable Calculus 3(3,0) Introduction to the calculus of several variables, differential calculus and optimization of several variables, multiple integrals. Topics from the management sciences are used to illustrate the above concepts. May not be taken by students who have passed MTHSC 206. *Prq:* MTHSC 102, or 106 with consent of instructor.

MTHSC 208, H208 Introduction to Ordinary Differential Equations 4(4,0) Introduction to the study of differential equations and their application to physical problems. Topics include exact, series, and numerical solutions; solutions by means of Laplace transforms; and solutions of systems of differential equations. *Prq:* MTHSC 206.

MTHSC 210 Applied Matrix Algebra 3(3,0) Introduction to the basic principles of matrix algebra with applications to the behavioral and managerial sciences. Major areas of application include linear programming, directed graphs, and game theory. *Prq:* MTHSC 101 and 102 or 106.

MTHSC 216 Geometry for Elementary School Teachers 3(3,0) Informal treatment of the basic concepts of geometry. Open to Elementary, Early Childhood, and Special Education majors only. *Prq:* MTHSC 116 or consent of instructor.

MTHSC 231 Mathematics of Life Insurance 3(3,0) Introduction to basic mathematics of finance and life insurance. Topics include compound interest, annuities certain, mortality tables, life annuities, net premiums, net level reserves, modified reserves, nonforfeiture values, and dividends.

MTHSC 250 Introduction to Mathematical Sciences 1(1,0) Lectures and discussions on the mathematical sciences disciplines: applied mathematics, computing science, core mathematics, management science, operations research, and statistics. *Preq:* MTHSC 106.

MTHSC 301, H301 Statistical Theory and Methods 1 3(3,0) Principal topics include elementary probability theory, discrete and continuous random variables, expected values, normal distribution, chi-square distribution, t -distribution, F -distribution, tests of hypotheses, point and interval estimation, curve fitting. Credit toward a degree will be given for only one of EX ST 301, MTHSC 301, 302, 309. *Preq:* MTHSC 106 or 207 or 210.

MTHSC 302 Statistics for Science and Engineering 3(3,0) Methodology for collecting, organizing, and interpreting data. Topics include understanding variability, graphical and numerical summarization of data, introductory probability, normal and related distributions, statistical inference, experimental design, simple linear regression. Statistical microcomputer software is used. Credit toward a degree will be given for only one of EX ST 301, MTHSC 301, 302, 309. *Preq:* MTHSC 206.

MTHSC 308 College Geometry 3(3,0) Theorems and concepts more advanced than those of high school geometry. Treatment of the various properties of the triangle, including the notable points, lines, and circles associated with it. *Preq:* MTHSC 106.

MTHSC 309 Introductory Business Statistics 3(3,0) Introductory probability and statistics for business students, particularly those who will take MGT 310. Topics include descriptive statistics, probability, expectations, binomial, normal, sampling distributions, one and two sample estimation and testing. Credit toward a degree will be given for only one of EX ST 301, MTHSC 301, 302, 309. *Preq:* MTHSC 106 or 207 or 210.

MTHSC 311, H311 Linear Algebra 3(3,0) Introduction to the algebra of matrices, vector spaces, polynomials, and linear transformations. *Preq:* MTHSC 108 or consent of instructor.

MTHSC 360 Intermediate Mathematical Computing 3(3,0) Continuing study of mathematical computing using the FORTRAN language. Emphasis is on subroutine computation with applications to problems in science and engineering. *Preq:* CP SC 110 or consent of instructor.

MTHSC H382 Honors Seminar 1(1,0) Weekly seminar to prepare students in Departmental Honors Program for independent senior research. At the end of the second semester, each student must have identified a research topic and a faculty advisor. May be repeated for a maximum of two credits. *Preq:* Junior standing in departmental honors program.

MTHSC 400, H400, 600 Theory of Probability 3(3,0) Principal topics include combinatorial theory, probability axioms, random variables, expected values; special discrete and continuous distributions, jointly distributed random variables, correlation, conditional expectation, law of large numbers, central limit theorem. *Preq:* MTHSC 206 or consent of instructor.

MTHSC 403, H403, 603 Introduction to Statistical Theory 3(3,0) Principal topics include sampling distributions, point and interval estimation, maximum likelihood estimators, method of moments, least squares estimators, tests of hypotheses, likelihood ratio methods, regression and correlation analysis, introduction to analysis of variance. *Preq:* MTHSC 400 or equivalent.

MTHSC 405, 605 Statistical Theory and Methods II 3(3,0) Principal topics include simple linear regression, multiple regression and correlation analysis, one-way analysis of variance, multiple comparison, multifactor analysis of variance, experimental design. Computation and interpretation of results are facilitated through use of statistical computer packages. *Preq:* MTHSC 301.

MTHSC 406, 606 Sampling Theory and Methods 3(3,0) Probability-based treatment of sampling methodology. Theory and application of estimation techniques are treated using simple and stratified random sampling, cluster sampling, and systematic sampling. *Preq:* MTHSC 302 and 400, or consent of instructor.

MTHSC 407, 607 Regression and Time Series Analysis 3(3,0) Theory and application of the regression and time series. Approaches to empirical model building and data analysis are treated. Computation and interpretation of results are facilitated through the use of interactive statistical packages. *Preq:* MTHSC 302, 311, 400, or consent of instructor.

MTHSC 408, 608 Topics in Geometry 3(3,0) Introduction to topics in special geometries which include non-Euclidean space concepts such as projective geometry, finite geometries, and intuitive elementary topology. Brief introduction to vector geometry. *Preq:* MTHSC 206.

MTHSC 410 Number Theory 3(3,0) Introduction to theory of integers and related number systems. Topics include historical development, principle of mathematical induction, divisibility, primes, congruences, number-theoretic functions, primitive roots, quadratic residues, and diophantine equations. *Preq:* MTHSC 108 or consent of instructor.

MTHSC 412, H412, 612 Introduction to Modern Algebra 3(3,0) Introduction to the concepts of algebra. Topics include the number system and the elementary theory of groups, rings, and fields. *Preq:* MTHSC 311.

MTHSC 419, H419, 619 Discrete Mathematical Structures I 3(3,0) Applies theoretical concepts of sets, functions, binary relations, graphs, Boolean algebras, propositional logic, semigroups, groups, homomorphisms, and permutation groups to computer characteristics and design, words over a finite alphabet and concatenation, binary group codes, and other communication or computer problems. *Preq:* MTHSC 311.

MTHSC 430 Actuarial Science Seminar I 1(1,0) Problem-solving seminar designed to prepare students for the examination on the Society of Actuaries' and Casualty Actuarial Society's Course 1 (Mathematical Foundations of Actuarial Science). *Preq:* MTHSC 400 or consent of instructor.

MTHSC 431 Theory of Interest 3(3,0) Comprehensive treatment of the theory of interest including from a calculus-based continuous viewpoint. Topics include simple and compound interest and discount, nominal and effective rates, force of interest, basic and general annuities, yield rates amortization and sinking funds, and applications to bonds, mortgages, and other securities. *Preq:* MTHSC 206.

MTHSC 432 Actuarial Science Seminar II 1(1,0) Problem-solving seminar to prepare students for the examination on the Society of Actuaries' and Casualty Actuarial Society's Course 2 (Interest Theory, Economics and Finance). *Preq:* ECON 211, 212, FIN 306 or 311, MTHSC 431, or consent of instructor.

MTHSC 434, 634 Advanced Engineering Mathematics 3(3,0) Fourier series, Laplace and Fourier transform, and numerical methods for solving initial value and boundary-value problems in partial differential equations are developed. Applications to diffusion wave and Dirichlet problems are given. Matrix methods and special functions are utilized. *Preq:* MTHSC 208.

MTHSC 435, H435, 635 Complex Variables 3(3,0) Elementary functions; differentiation and integration of analytic functions; Taylor and Laurent series; contour integration and residue theory; conformal mapping; Schwartz-Christoffel transformation. *Preq:* MTHSC 206.

MTHSC 440, H440, 640 Linear Programming 3(3,0) Introduction to linear programming covering the simplex algorithm, duality, sensitivity analysis, network models, formulation of models, and the use of simplex codes to solve, interpret, and analyze problems. *Preq:* MTHSC 206, 311, or consent of instructor.

MTHSC 441, H441, 641 Introduction to Stochastic Models 3(3,0) Introductory treatment of stochastic processes, finite-state Markov chains, queueing, dynamic programming, Markov decision processes, reliability, decision analysis, and simulation. Both theory and applications are stressed. *Preq:* MTHSC 400.

MTHSC 450 Introduction to Mathematical Models 3(3,0) Study of the modeling process which includes translation of practical problems into mathematical models, solution of the mathematical models, and interpretation of the solution back into practical problems. Examples are chosen from the physical, biological, social, and management sciences. *Preq:* CP SC 110, MTHSC 208.

MTHSC 453, H453, 653 Advanced Calculus I 3(3,0) Limits, continuity, and differentiation of functions of one and several variables, the Riemann integral, and vector analysis. *Preq:* MTHSC 206.

MTHSC 454, H454, 654 Advanced Calculus II 3(3,0) Continuation of MTHSC 453. Transformations, multiple integrals, line and surface integrals, infinite series and series, and improper integrals. *Preq:* MTHSC 453.

MTHSC 460, 660 Introduction to Numerical Analysis I 3(3,0) Introduction to the problems of numerical analysis emphasizing computational procedures and application. Topics include sources of error and conditioning, matrix methods, systems of linear equations, nonlinear equations, interpolation and approximation by splines, polynomials, and trigonometric functions. *Prq:* MTHSC 206 or 207 and 360 or equivalent.

MTHSC 463, H463, 663 Mathematical Analysis I 3(3,0) Basic properties of the real number system, sequences and limits; continuous functions; uniform continuity and convergence. Integration, differentiation, functions of several real variables, implicit function theory. *Prq:* MTHSC 206.

MTHSC 481 Seminar in Mathematics I-3(1-3,0) Attention is focused on mathematical areas in which nonroutine problems can be posed with comparative ease. Emphasis is on independent study and student use of previously acquired mathematical skills. Open to students only by invitation for not more than three hours credit.

MTHSC H482 Honors Research 3(3,0) Independent research, conducted under the supervision and guidance of a faculty member for students enrolled in departmental honors program. May be repeated once for a maximum of six credits. *Prq:* MTHSC H382.

MECHANICAL ENGINEERING

Professors: D. E. Beasley, S. B. Biggers, G. M. Fadel, R. S. Figliola, J. L. Gaddis, M. Grujicic, I. Haque, Chair; C. O. Huey, Jr., J. M. Kennedy, E. H. Law, D. A. Zumbunnen; *Associate Professors:* P. F. Joseph, J. I. Leylek, J. M. Ochterbeck, L. L. Thompson; *Assistant Professors:* E. M. Austin, Y. Huang, N. Jalili, J. R. Saylor, J. D. Summers, C. Tong, J. R. Wagner, J. D. Wood; *Lecturers:* D. C. Moline, J. B. Riester; *Adjunct Professors:* B. Han, C. D. Rahm, P. M. Taylor

M E 202 Foundations of Mechanical Systems 3(3,0) Introduction to basic physical elements of mechanical engineering systems. Problem-solving, design, and resourceful application of mathematics and general principles from students' science courses are emphasized throughout. *Prq:* MTHSC 108, PHYS 122, E M 201 (or concurrent enrollment).

M E 203 Foundations of Thermal and Fluid Systems 3(3,0) Introduction to control volumes, conservation laws of mass, momentum, and energy. Concepts of work and heat are introduced, including rate forms. Properties of pure substances. *Prq:* MTHSC 206, PHYS 221.

M E 205 Computer Analysis in Engineering 2(2,0) [C.1] Application of undergraduate mathematics and basic engineering principles with an emphasis on numerical methods and the use of mathematical software packages in the solution of engineering problems. Problems are drawn from dynamics, vibrations, kinematics, thermodynamics, heat transfer, materials engineering, fluid mechanics, and other engineering fields. *Prq:* ENGR 120, MTHSC 208 (or concurrent enrollment), PHYS 122, Mechanical Engineering major.

M E 221 Mechanical Engineering Laboratory I 1(0,3) Discovery of mechanical engineering principles and phenomena. Introduction to laboratory safety practices, instrumentation, calibration techniques, data analysis, and report writing. *Prq:* M E 202 (or concurrent enrollment), 203 (or concurrent enrollment), PHYS 221.

M E H300 Junior Honors Seminar 0 Acquaints students enrolled in Departmental Honors Program with current research activities in the Department of Mechanical Engineering. Faculty provide seminars where research interests are summarized. These seminars are planned to prepare students in choosing a research topic for the senior thesis. *Prq:* Junior standing in departmental honors program.

M E 301 Materials for Mechanical Engineering Applications 3(3,0) Properties and selection of materials of interest to mechanical engineers. Emphasis is on the interrelations between the microstructure, processing, and properties of materials. *Prq:* CH 102, E M 304 (or concurrent enrollment).

M E 303 Thermodynamics 3(3,0) Study of the second law and entropy; applications to fixed mass systems and control volumes; vapor and gas power cycles; mixtures of gases; vapor psychrometrics; combustion and the third law. Thermochemical equilibrium. *Prq:* M E 203.

M E 304 Heat Transfer 3(3,0) Steady and transient heat conduction, free and forced convection, radiation, and multi-mode heat transfer. Emphasis is on analytical and numerical solutions to engineering heat transfer problems with a design orientation. *Prq:* E M 320, M E 203.

M E 305 Modeling and Analysis of Dynamic Systems 3(3,0) Techniques for developing and analyzing physical and mathematical models of mechanical and electromechanical systems are presented. Transient and frequency response are determined using analytical and numerical methods. Basic feedback systems are introduced. *Prq:* E C E 307, E M 202, M E 202, 205, MTHSC 208.

M E 306 Fundamentals of Machine Design 3(3,0) Introduction to failure theory, fatigue analysis, and energy methods for deflection analysis. Integration of these topics with selected portions of mechanics of materials and application of them to the design and analysis of machine elements. *Prq:* E M 304.

M E 310 Thermodynamics and Heat Transfer 3(3,0) Introduction to thermodynamics and heat transfer for nonmajors: properties of liquids and gases, first and second law analysis, introduction to cycles for power and refrigeration, heat flow by conduction and radiation, and convective heat flow and heat exchangers. *Prq:* Junior standing in an engineering curriculum.

M E 322 Mechanical Engineering Laboratory II 2(1,3) Mechanical engineering principles and phenomena are reinforced through student conducted experiments. Presentation of fundamentals of instrumentation, calibration techniques, data analysis, and report writing in the context of laboratory experiments. *Prq:* E M 304 (or concurrent enrollment), M E 303 (or concurrent enrollment), M E 221, MTHSC 208.

M E 323 Mechanical Engineering Laboratory III 2(1,3) Continuation of M E 322. Mechanical engineering principles and phenomena are reinforced through student-conducted experiments. Presentation of fundamentals of instrumentation, calibration techniques, data analysis, and report writing in the context of laboratory experiments. *Prq:* M E 301 (or concurrent enrollment), 304 (or concurrent enrollment), 305 (or concurrent enrollment), 306 (or concurrent enrollment), M E 322, MTHSC 302 or EX ST 411.

M E 400 Senior Seminar I 1(1,0) Seminars address the problems encountered by engineering graduates in professional practice. Invited lecturers as well as faculty provide the lectures and demonstrations. *Prq:* All required 300-level E C, E M, and M E courses or consent of instructor.

M E 401 Mechanical Engineering Design 3(3,0) [O.1, W.2] Project-oriented course in mechanical engineering. Emphasis is on the role of analysis, synthesis, and evaluation in design and on written reporting of design solutions. Influence of economics and optimization, concurrent development, integration of design and manufacturing, and system creation are utilized for engineering design decisions. *Prq:* M E 301, 303, 304, 305, 306 (Concurrent enrollment in one of these courses is permitted with departmental approval.)

M E 402 Internship in Engineering Design 3(1,6) [O.2, W.1] Creative application of general engineering knowledge in solving an open-ended design problem provided by a sponsor typically external to the University. Progress is evaluated by a faculty jury. Students present results to the jury and sponsor through written reports and oral presentations addressing University written/oral competency goals. *Prq:* M E 401, 404 (or concurrent enrollment).

M E 404 Manufacturing Processes and Their Application 3(3,0) Fundamental principles associated with production processes and their application to the manufacture of products from metals, polymers, ceramics, and composites. Emphasizes the physical and quantitative aspects of processing, the selection of processes to create products, and the identification of processes used to manufacture existing products. *Prq:* M E 301, 303, 304, 305, 306, 323.

M E 405 Kinematics and Dynamics of Machinery I 3(3,0) Graphical, analytical, and numerical techniques are used in the dynamic analysis and synthesis of machines. Emphasis is on the application of these analysis techniques to planar linkages. *Prq:* E M 202, 304, M E 205.

M E 407, 607 Applied Heat Transfer 3(3,0) Application oriented extension of M E 304, considering topics in transient conduction, flow of fluids, energy exchange by radiation, and mass transfer. Applications in heat-exchanger design with emphasis on economics and variation of operating conditions from the design point. *Prq:* M E 304, consent of instructor.

M E 415, H415 Undergraduate Research I-3 Individual research projects conducted under the direct supervision and guidance of a faculty member. May be repeated for a maximum of six credits. *Prq:* Consent of instructor.

M E 416, 616 Control of Mechanical Systems 3(3,0) Physical modeling and feedback principles are presented for control of mechanical systems. Transient response, root locus, and frequency response principles are applied to the control of basic mechanical systems such as electric motors, fluid tanks, or thermal processes. PID control laws are emphasized. *Preq:* M E 305.

M E 417, 617 Mechatronics System Design 3(3,0) Mechatronics integrates control, sensors, actuators, and computers to create a variety of electromechanical products. Includes concepts of design, appropriate dynamic system modeling, analysis, sensors, actuating devices, and real time microprocessor interfacing and control. Case studies, simulation, and projects are used to exemplify the system design principles. *Preq:* M E 305 or consent of instructor.

M E 418 Finite Element Analysis in Mechanical Engineering Design 3(2,3) Introduction to the finite element method. Introduction to solid modeling, finite element modeling and analysis using commercial codes. Analysis strategies using finite elements. Applications to heat transfer, fluid flow, and structures. *Preq:* E M 304, 320, M E 205, 304, or consent of instructor.

M E 420, 620 Energy Sources and Their Utilization 3(3,0) Covers availability and use of energy sources such as fossil fuels, solar (direct and indirect), and nuclear; addresses energy density and constraints to use (technical and economic) for each source. *Preq:* M E 303, 304.

M E 421, 621 Introduction to Compressible Flow 3(3,0) Introductory concepts to compressible flow; methods of treating one-dimensional gas dynamics including flow in nozzles and diffusers, normal shocks, moving and oblique shocks, Prandtl-Meyer Flow, Fanno Flow, Rayleigh Flow, and reaction propulsion systems. *Preq:* E M 320, M E 303.

M E 422, 622 Design of Gas Turbines 3(3,0) Guiding principles in gas turbine cycles are reviewed. Turbine and compressor design procedures and performance prediction for both axial and radial flow machines are presented. Methods of design of rotary heat-exchangers and retrofitting gas turbine for regenerative operation are presented. Design projects are used to illustrate the procedures. *Preq:* E M 320.

M E 423, 623 Introduction to Aerodynamics 3(3,0) Basic theories of aerodynamics are presented for the purpose of accurately predicting the aerodynamic forces and moments which act on a vehicle in flight. *Preq:* E M 320.

M E 424 Mechanical Engineering Laboratory IV 1(0,3) Continuation of M E 323. Mechanical engineering principles and phenomena are reinforced through open-ended, student designed and conducted experiments. Utilization of mature skills in measurement techniques, data analysis, and report writing. *Preq:* M E 301, 303, 304, 305, 306, 323; M E 404 (or concurrent enrollment).

M E 429, 629 Thermal Environmental Control 3(3,0) Mechanical vapor compression refrigeration cycles, refrigerants, thermoelectrical cooling systems, cryogenics, thermodynamic properties of air, psychometric charts, heating and cooling coils, solar radiation, heating and cooling loads, insulation systems. *Preq:* E M 320, M E 303.

M E 430, 630 Mechanics of Composite Materials 3(3,0) Fundamental relationships for predicting the mechanical and thermal response of multi-layered materials and structures are developed. Micromechanical and macromechanical relationships are developed for laminated materials with emphasis on continuous filament composites. The unique nature of composites and the advantages of designing with composites are discussed. *Preq:* E M 304.

M E 431 Applied Fluids Engineering 3(3,0) Applications-oriented course in industrial fluids engineering, primarily directed toward the analysis and design of piping systems and components for liquid and gas flow. Topics include friction factors, head loss, flow capacities, piping networks, flow measurement, pumps, control valves, and hydraulic and pneumatic components. *Preq:* E M 320, M E 322.

M E 432, 632 Advanced Strength of Materials 3(3,0) Topics in strength of materials not covered in E M 304. Three-dimensional stress and strain transformations, theories of failure, shear center, unsymmetrical bending, curved beams, and energy methods. Other topics such as stress concentrations and fatigue concepts are treated as time permits. *Preq:* E M 304.

M E 440 Materials for Aggressive Environments 3(3,0) Emphasizes the engineering aspects of selecting materials for applications in aggressive environments. Various types of materials degradation are discussed as are methods for wastage prevention, including especially engineering design and materials selection approaches. Structural metallic alloys are emphasized; however, technically important ceramics and polymers are also discussed. *Preq:* M E 301, 306.

M E 450, 650 Mechanical Vibrations 3(3,0) Mathematical analysis of physical problems in the vibration of mechanical systems. Topics include linear-free vibrations, forced vibrations, and damping in single degree of freedom systems, transient vibrations, critical speeds and whirling of rotating shafts, dynamic balancing, and multi-degree of freedom systems with lumped parameters. *Preq:* E M 202, 304, MTHSC 208.

M E 453, 653 Dynamic Performance of Vehicles 3(3,0) Introduces techniques for analyzing the dynamic behavior of vehicles. Types of vehicles to be considered are chosen from aircraft, space ships, automobiles and trucks, railway vehicles, and magnetically levitated vehicles. *Preq:* M E 205, 305, or consent of instructor.

M E 454, 654 Design of Machine Elements 3(3,0) Design of common machine elements including clutches, brakes, bearings, springs, and gears. Optimization techniques and numerical methods are employed as appropriate. *Preq:* M E 306 or consent of instructor.

M E 455, 655 Design for Computer-Automated Manufacturing 3(3,0) Concepts of product and process design for automated manufacturing are considered. Topics include product design for automated manufacturing, inspection and assembly, using automation, industrial robots, knowledge-based systems and concepts of flexible product manufacture. *Preq:* M E 301, 306, 404 (or concurrent enrollment), or consent of instructor.

M E (E C E) 456, 656 Fundamentals of Robotics 3(3,0) Introduction to the fundamental mechanics and control of robots, including their application to advanced automation. Topics include robot geometry, kinematics, dynamics, and control. Planar machine structures are emphasized, including methods using computer analysis. Application considerations include the design and operation of robot systems for manufacturing and telerobotics. *Preq:* M E 305, 416 (or concurrent enrollment), or consent of instructor.

M E 471, 671 Computer Aided Engineering Analysis and Design 3(3,0) Students are exposed to geometric and solid modeling, finite elements, optimization, and rapid-prototyping. Students design an artifact, represent it on the computer, analyze it using FEA, then optimize before prototyping it. Emphasizes the use of computer-based tools for engineering design. The World Wide Web is used for reporting. *Preq:* Numerical methods and programming experience or consent of instructor.

M E 493, 693 Selected Topics in Mechanical Engineering 1-6(1-6,0) Study of topics not found in other courses. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

MICROBIOLOGY

Professors: S. S. Hayasaka, T. A. Hughes, L. L. Larcom, M. J. B. Paynter, T. E. Schwedler, T. R. Scott; *Associate Professor:* W. Y. Chen; *Assistant Professors:* X. Jiang, H. D. Kurtz; *Lecturers:* P. A. Mickelsen, T. R. Tzeng

MICRO 100 Microbes and Human Affairs 1(1,0) Explanation of the roles of microorganisms in today's world and the significance of microbes to the future of mankind.

MICRO 205 Introductory Microbiology 4(3,3) Basic concepts of microbiology, introduced through classroom and laboratory experiences. Emphasis is on practical applications in various areas of importance to man. Recommended for students not majoring in a biological science. Not open to Microbiology majors. *Preq:* CH 101, 102, BIOL 103.

MICRO 305, 605 General Microbiology 4(3,3) Morphology, physiology, classification, distribution, and cultivation of microorganisms. *Preq:* Introductory biology, CH 101, 102.

MICRO 400, 600 Public Health Microbiology 3(3,0) Epidemiology of transmissible diseases including pathogenic characteristics of the infectious organism, modes of transmission, mechanism of infection, diagnostic aids, effective treatments, immunizing procedures and methods of preventing infection. *Preq:* MICRO 305.

MICRO 401, H401, 601 Advanced Bacteriology 4(2,6) Metabolism, nutrition, growth, and death of bacteria; microbiological assays and industrial fermentation, emphasis on laboratory procedures for the identification of the more common taxonomic groups. *Preq:* CH 201 or 223, 227, MICRO 305.

MICRO 403, 603 Marine Microbiology 3(2,3) Discussion of the microbes that inhabit the marine environment, their peculiar physiological traits, and contributions to the ecology of oceans. *Preq:* MICRO 305, organic chemistry.

MICRO 407, H407, 607 Food and Dairy Microbiology 4(3,3) Physical-chemical factors limiting survival and growth of microorganisms during processing and manufacturing of food and dairy products. Standard methods for enumerating and identifying indicator bacteria, yeasts, molds, and microbes producing food and food-borne illness. Starter cultures, fungal toxins, microbial cell injury and standards for food and dairy products. *Preq:* BIOC3 305 or CH 201 or 223, MICRO 305.

MICRO 410, H410, 610 Soil Microbiology 3(2,3) Role of microorganisms in the decomposition of organic substances, transformation of nitrogen and mineral substances in the soil; interrelationships between higher plants and microorganisms; importance of microorganisms in soil fertility. *Preq:* MICRO 305.

MICRO 411, H411, 611 Pathogenic Bacteriology 4(3,3) Study of pathogenic bacteria, their morphology, cultural requirements and classification; diagnostic tests, methods of differentiation, and the diseases caused. *Preq:* MICRO 305.

MICRO 412, H412, 612 Bacterial Physiology 4(3,3) Consideration of the cytology, physiology, metabolism, and genetics of bacteria. Includes studies of growth and death, reproduction and mutation, nutrition and metabolic pathways, regulatory mechanisms, and effects of environment. *Preq:* CH 224, MICRO 305, one semester of biochemistry, or consent of instructor.

MICRO 413, H413, 613 Industrial Microbiology 3(2,3) Microbial aspects of large-scale processes for the production of foods, antibiotics, enzymes, fine chemicals, and beverages. Topics include strain selection, culture maintenance, biosynthetic pathways, continuous cultivation and production of single cell protein. *Preq:* MICRO 305.

MICRO (AVS, BIOSC) 414, H414, 614 Basic Immunology 4(3,3) Consideration of the nature, production, and function of basic immune responses in animals. Procedures and mechanisms of antigen-antibody and other immune reactions. *Preq:* MICRO 305, organic chemistry.

MICRO 415, H415, 615 Microbial Genetics 4(3,3) Cytological basis of bacterial, fungal, and viral genetics; molecular aspects; mutations; mechanisms of genetic transfers; episomes and plasmids; and population changes. *Preq:* BIOC3 301, CH 224, MICRO 305, or consent of instructor.

MICRO 416, H416, 616 Introductory Virology 3(3,0) General introduction to the field of virology, including animal, bacterial, and plant viruses. Topics include nomenclature and classification, biochemical and biophysical characteristics, mechanisms of replication, chemotherapy, and techniques for isolation, assay, and purification. *Preq:* BIOC3 301, MICRO 305, or consent of instructor.

MICRO 417, H417, 617 Molecular Mechanisms of Carcinogenesis and Aging 3(3,0) Changes which occur at the cellular and subcellular levels during transformation and aging. Accumulated damage and "intrinsic clock" theories of aging; genetic and epigenetic theories of carcinogenesis; epidemiology of cancer; viral, radiation-induced, and chemical carcinogenesis; the immune system and cancer. *Preq:* BIOC3 301, MICRO 305, or consent of instructor.

MICRO (BIOSC, GEN) 418, 618 Biotechnology I: Nucleic Acids Techniques 4(2,4) See GEN 418.

MICRO 419, 619 Selected Topics in Molecular Medicine 3(3,0) Introduction to various areas of molecular medicine. Examines the latest research and developments in molecular medicine. Designed for students interested in medicine and biomedical research. Graduate students may repeat for a maximum of six credits. *Preq:* BIOC3 301, MICRO 305, or consent of instructor.

MICRO 491 Special Problems in Microbiology 1-3(0,3-9) Research problems in various areas of microbiology which introduce undergraduate students to the planning and execution of research experimentation and the presentation of research findings. May be repeated with advisor's approval.

MICRO H491 Honors Special Problems in Microbiology 3(0,9) Research problems in various areas of microbiology which introduce undergraduate students to the planning and execution of research experimentation and the presentation of research findings. May be repeated for a maximum of six credits with consent of instructor. *Preq:* Membership in Calhoun Honors College Program; consent of instructor.

MILITARY LEADERSHIP

Professor: W. R. Hanson, *Chair*; *Assistant Professors:* B. E. Griffin, M. D. Mitchiner, B. S. Moore, W. M. Parker, G. J. Walker

M L 101 Leadership Fundamentals I 2(2,1) Study of leadership focused at the individual level. Students learn effective communicating skills, ethical decision making, small group management, and mental and physical conditioning. Skills are applied in a variety of challenging training events during laboratory, including rappelling, water survival, land navigation, and team activities.

M L 102 Leadership Fundamentals II 2(2,1) Continued study of leadership focused at the individual and team levels. Topics include problem solving, critical thinking, leadership styles, and group cohesion. Leadership laboratory training includes small tactics and weapons firing.

M L 103 Becoming a Leader 3(3,0) Study of basic leadership, covering leadership theory and skills, organizational systems to support leaders, problem solving, values and ethics, and communication skills. Includes lecture, practical exercises, and guest speakers.

M L 201 Leadership Development I 2(2,1) Study of leadership focused at the team level. Students develop leadership skills through public speaking, managing small groups, and mentoring first-year students. Skills are applied in a variety of challenging training events during leadership laboratory, including rappelling, water survival, land navigation, and team-building exercises.

M L 202 Leadership Development II 2(2,1) Continued study of leadership at the team and small group levels. Focuses on moral leadership, officer-ship, and the Army as a profession. Leadership laboratory training includes small unit tactics, airborne operations, and weapons firing. Students lead teams throughout the semester.

M L 210 Leaders' Training Course 4(2,6) Five-week leadership camp conducted on an Army post. Students' pay and expenses are provided by the U.S. Army. Environment is rigorous and focused on leadership development. No military obligation is incurred. Completion of this course qualifies students for entry into the Army ROTC Advanced Course.

M L 211 Cadet Field Leadership Training 1-6 Eight-week program of instruction conducted by the U.S. Military Academy to develop leadership skills of sophomore students. Seven weeks of the course are held at West Point with one week at Fort Knox, KY, for Mounted Maneuver Training. To be taken Pass/Fail only. *Preq:* M L 202.

M L 301 Advanced Leadership I 3(2,2) Study of leadership focused on decision making, planning, communicating, and executing. Addresses motivational techniques, the role of a leader, and performance assessment. Provides students with leadership management tools and methodology. Students are responsible for training, developing, and mentoring Basic Course students. Students apply learned techniques in leadership laboratory. *Preq:* M L 202 or 210.

M L 302 Advanced Leadership II 3(2,2) Continuation of leadership study focusing on collective skills training, tactics, and small group instruction. Synthesizes various components of training, leadership, and team-building learned during the Basic Course and M L 301. Final step in students' progression prior to the National Advanced Leadership Camp. *Preq:* M L 301.

M L 401 Organizational Leadership I 3(2,2) Culmination of leadership study in preparation for commissioning as an Army officer. Students continue exercising leadership and management skills as senior cadet leaders. Leadership instruction focuses on coordinating activities with staffs, communicating effectively, counseling and mentoring subordinates, training management and ethics. *Preq:* M L 302, National Advanced Leadership Camp.

M L 402 Organizational Leadership II 3(2,2) Continuation of M L 401. Focuses on the continued study of moral, ethical, and legal issues faced by leaders. Includes instruction in administrative and logistical management. Requires students to apply their knowledge individually and collectively to solve problems and improve the organization. *Preq:* M L 401.

MUSIC

Professors: R. E. Goodstein, *Chair*; L. U. Harder, D. R. Rash; *Associate Professors:* N. M. Hosler, A. R. Levin; *Assistant Professors:* P. L. Buyer, L. Dzuris, L. L. Li-Beuel, M. J. Speder; *Lecturers:* G. S. Alewine, E. J. Austin, M. Anderson, P. G. Elliott, J. B. Fankhauser, T. Hayden, J. H. Merrell, D. Owens, M. G. Rowell, S. M. Sawyer, H. R. Spires, D. E. Stevenson, W. H. Thomas, C. Ulrich, B. A. Whisler, W. H. Zaros

MUSIC 101 Beginning Class Piano I 1(0,2) Thorough introduction to basic keyboard skills including solo and ensemble repertoire, technique, applied keyboard theory, and performance. Applied music fee is assessed. *Preq:* Consent of instructor.

MUSIC 102 Beginning Class Piano II 1(0,2) Continued work on keyboard skills, applied keyboard theory, solo and ensemble repertoire, and performance. Applied music fee is assessed. *Preq:* MUSIC 101 or consent of instructor.

MUSIC 111 Beginning Class Guitar 1(0,2) Introduction to basic guitar skills, including finger-style technique, strumming, and song accompaniment. Students develop skills and appreciation of the discipline through teacher-led drills, ensemble playing, and the exploration of guitar history, style, and the impact of various players and composers on the medium. Applied music fee is assessed. *Preq:* Consent of instructor.

MUSIC 121 Beginning Class Voice 1(0,2) Introduction to basic vocal skills, including breathing, tone production, diction, intonation, and interpretation. Includes solo and ensemble repertoire. In-class group and individual performances are required. Applied music fee is assessed. *Preq:* Consent of instructor.

MUSIC 131 Beginning Instrumental Class 1(0,2) Introduction to basic instrumental skills in a class setting, including proper playing position, tone production, intonation, and ensemble playing. Includes brief history and usage of the given instruments. Different instrumental groups are taught as separate course sections. May be repeated for a maximum of six credits, but only on other instruments. Applied music fee will be assessed. *Preq:* Consent of instructor.

MUSIC 151 Applied Music 1(0,1) Individual study in performance medium (piano, voice, strings, woodwinds, brass, percussion, guitar, organ, or carillon). One 30-minute lesson each week, for which a minimum of four hours practice is required. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* Consent of instructor, based upon a qualifying audition.

MUSIC 152 Applied Music 1(0,1) Continuation of MUSIC 151. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* MUSIC 151.

MUSIC 153 Applied Music for Majors 1(0,1) Individual study in vocal or instrumental performance (voice, woodwinds, brass, strings, percussion or keyboards). One 45-minute lesson each week. Jury required. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* Performing Arts major (Music Concentration) and consent of instructor, based upon qualifying audition.

MUSIC 154 Applied Music for Majors 1(0,1) Continuation of MUSIC 153. Jury and performance on a recital are required. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* MUSIC 153, consent of instructor.

MUSIC 180 Introduction to Music Technology 3(2,3) [C-2] Introduction to music notation, sequencing, digital audio, sound reinforcement, analog and digital recording, and other current music technologies. *Preq:* Performing Arts major or consent of instructor.

MUSIC 205 Music Theory I 3(2,2) Terminology and notation of traditional music are reviewed, and the techniques of sight-singing and melodic dictation are practiced. Harmonic practices are studied, relating to the principal diatonic triads in all inversions. *Preq:* Consent of instructor, based on musical literacy.

MUSIC 206 Music Theory II 3(2,2) Continuation of MUSIC 205 with emphasis on diatonic triads and seventh chords in all inversions, non-chord tones, and basic elements of musical form. Practice in sight singing, melodic dictation, and harmonic dictation is included. *Preq:* MUSIC 205.

MUSIC 210, H210 Music Appreciation: Music in the Western World 3(3,0) Deepens students' appreciation of their musical heritage through study of the elements of the musical language and its development in Western culture.

MUSIC 251 Applied Music 1(0,1) Continuation of MUSIC 152. Applied music fee is assessed. *Preq:* MUSIC 152, consent of instructor.

MUSIC 252 Applied Music 1(0,1) Continuation of MUSIC 251. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* MUSIC 251, consent of instructor.

MUSIC 253 Applied Music for Majors 1(0,1) Continuation of MUSIC 154. May be repeated for credit on other performance media with departmental approval. Jury is required. Applied music fee is assessed. *Preq:* MUSIC 154, consent of instructor.

MUSIC 254 Applied Music for Majors 1(0,1) Continuation of MUSIC 253. May be repeated on other performance media with departmental approval. Jury and performance on a recital are required. Applied music fee is assessed. *Preq:* MUSIC 253, consent of instructor.

MUSIC 279 Music Laboratory 1(0,3) Practical work in music on productions designed for public presentation. Emphasis is placed on sound support, amplification, and mixing. May be repeated for a maximum of four credits. *Preq:* Consent of instructor.

MUSIC 310 Survey of Music History 3(3,0) Comprehensive survey of the Western art music tradition from the Middle Ages to the present. *Preq:* MUSIC 206, Performing Arts major, or consent of instructor.

MUSIC 311 History of American Music 3(3,0) Music in America from 1620 to the present. Indigenous and borrowed influences are examined.

MUSIC 312 History of Jazz 3(3,0) Comprehensive survey of jazz elements and styles. A historical perspective from Dixieland to bebop to jazz/rock is included.

MUSIC 313 History of Rock and Roll 3(3,0) Comprehensive survey of rock elements, styles, and artists. Emphasis is on the evolution of rock and roll including a broad examination of musical influences. Course content examines how rock and roll both reflected and influenced social issues.

MUSIC 314 World Music 3(3,0) Introduction to ethnomusicology and music of the world's peoples. Emphasis is placed on music through culture.

MUSIC 317 History of Country Music 3(3,0) Chronological study of country music origins, styles, and artists. Emphasis is on the evolution of country music from a cultural expression of the South to a commercial art form of worldwide appeal.

MUSIC 321 Principles of Piano Performance I 3(3,0) In-depth study of the principles of piano performance focusing on how to interpret a musical score, develop technical skills and practice techniques, and use the body correctly at the keyboard. *Preq:* By audition.

MUSIC 322 Principles of Piano Performance II 3(3,0) Continuation of MUSIC 321. *Preq:* MUSIC 321 or consent of instructor.

MUSIC 323 Piano Accompanying I 1(0,3)¹ Group study in piano accompanying. Focus on sight-reading and choral, vocal, and instrumental accompanying. Students take group lessons and accompany choral groups and/or applied music students. *Preq:* Consent of instructor.

MUSIC 325 CU Carillonneurs 1(0,2)¹ Group study in playing the 47-bell University carillon. One two-hour meeting each week for which a minimum of two hours of individual practice is required. Participation in a recital is required. *Preq:* Musical keyboard experience, consent of the instructor.

MUSIC 330 Small Ensemble 1(0,3)¹ Ensembles: devoted to the musical training of instrumental, vocal ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. Enrollment in simultaneous sections is allowed. *Preq:* Consent of director.

MUSIC 331 Pep Band 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given in addition to the minimum rehearsal time. Simultaneous enrollment in multiple sections is allowed. *Preq:* Consent of director.

MUSIC 332 Woodwind Quintet 1(0,3)¹ Ensembles: advanced study of woodwind chamber music media. One one-hour class meeting each week, for which a minimum of two hours of ensemble practice is required. *Preq:* By audition only; concurrent enrollment in MUSIC 362.

MUSIC 333 String Quartet 1(0,3)¹ Ensembles: advanced study of string quartet repertoire. Two 90-minute meetings each week for which a minimum of two hours of practice is required. *Preq:* By audition only. *Coreq:* MUSIC 369, Applied Music.

MUSIC 334 Flute Choir 1(0,3)¹ Ensembles: study of flute ensemble literature. One 60-minute meeting each week for which a minimum of two hours of practice is required. *Preq:* By audition only.

MUSIC 336 Percussion Ensemble 1(0,2)¹ Ensembles: study and performance of percussion ensemble literature. One two-hour class meeting each week, for which a minimum of two hours of individual practice is required. *Coreq:* MUSIC 331, 362, 363, 364, or 369.

MUSIC 337 Steel Drum Band 1(0,2)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given in addition to the minimum rehearsal time. Rehearsals also include discussions of steel band history and performance practice. *Preq:* Consent of director.

MUSIC 341 Men's Breakout Ensemble 1(0,2)¹
Small ensembles: study of male a cappella/popular music on an advanced level. *Coreq:* MUSIC 370 or 372 or consent of instructor.

MUSIC 342 Women's Breakout Ensemble 1(0,2)¹
Small ensembles: study of women's a cappella/popular vocal music on an advanced level. Enrollment is limited, and priority will be given to students who are enrolled in a large choral ensemble. *Coreq:* MUSIC 370 or 371 or consent of instructor.

MUSIC 343 Men's Small Ensemble 1(0,2)¹
Small ensembles: study of male a cappella/popular, barbershop, and nostalgic music on an advanced level. *Coreq:* MUSIC 370 or 372 or consent of instructor.

MUSIC 344 Vocal Jazz Ensemble 1(0,3)¹
Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Coreq:* MUSIC 370, 371, 372 or consent of instructor.

MUSIC 351 Applied Music 1(0,1) Continuation of MUSIC 252. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* MUSIC 252, consent of instructor.

MUSIC 352 Applied Music 1(0,1) Continuation of MUSIC 351. Students are required to perform an appropriate solo in a student recital. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* MUSIC 351, consent of instructor.

MUSIC 353 Applied Music for Majors 1(0,1) Continuation of MUSIC 254. May be repeated on other performance media with departmental approval. Jury is required. Applied music fee is assessed. *Preq:* MUSIC 254, consent of instructor.

MUSIC 354 Applied Music for Majors 1(0,1)
Continuation of MUSIC 353. May be repeated on other performance media with departmental approval. Juried half-recital performance is required. Applied music fee is assessed. *Preq:* MUSIC 353, consent of instructor.

MUSIC 361 Marching Band 1(0,3)¹F Ensembles: devoted to musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 362 Symphonic Band 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 363 Jazz Ensemble 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 364 Concert Band 1(0,2)¹ Devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 369 Symphony Orchestra 1(0,3)¹ Mid-sized, college-community orchestra devoted to performing works from standard repertoire. Weekly evening rehearsals with one or more performances per semester. *Preq:* Consent of director.

MUSIC 370 Clemson University Singers 1(0,3)¹
Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 371 Women's Glee 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 372 Men's Glee 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 373 University Chorus 1(0,3)¹ Ensembles: devoted to the musical training of ensemble members through reading and rehearsal of appropriate music; public performances are given periodically in addition to the minimum rehearsal time. *Preq:* Consent of director.

MUSIC 398 Special Topics in Music 3(3,0) Consideration of select areas of study in music not addressed by other music courses. May be repeated once for credit. *Preq:* Consent of instructor.

MUSIC 400, 600 Music in the Elementary Classroom 3(3,0) Familiarizes teachers in the elementary classroom with traditional, Kodaly, Orff, and Kindermusik approaches in correlating music with language arts, mathematics, and social studies.

MUSIC 405 Instrumental and Vocal Arranging 3(2,3) Advanced study of the properties of instruments and voices and their combination in various small and large ensembles. Emphasis is placed on applying this knowledge to the creation of instrumental and vocal arrangements. *Preq:* MUSIC 180, 205, or consent of instructor.

MUSIC 415 Music History to 1750 3(3,0) Development of Western music from antiquity to 1750, emphasizing representative literature from various styles and periods. *Preq:* MUSIC 210, 310, or consent of instructor.

MUSIC 416 Music History Since 1750 3(3,0) Continuation of MUSIC 315. Music from 1750 to the present. *Preq:* MUSIC 210, 310, or consent of instructor.

MUSIC 430 Conducting 3(3,0) Study of choral and instrumental conducting. Emphasis is on manual conducting techniques, attitudes, philosophies, and responsibilities necessary for the preparation, planning, and execution of artistic conducting. *Preq:* MUSIC 205 or consent of instructor.

MUSIC 451 Applied Music 1(0,1) Continuation of MUSIC 352, guiding students in interpretation of advanced solo and ensemble literature. Students are required to perform an appropriate solo in a student recital. May be repeated for credit with departmental approval of differing performance media. Applied music fee is assessed. *Preq:* MUSIC 352 and consent of instructor.

MUSIC 452 Applied Music 1(0,1) Continuation of MUSIC 451. Students are required to perform an appropriate solo in a student recital. Applied music fee is assessed. *Preq:* MUSIC 451 and consent of instructor.

MUSIC 453 Applied Music for Majors 1(0,1) Continuation of MUSIC 354. May be repeated on other performance media with departmental approval. Jury is required. Applied music fee is assessed. *Preq:* MUSIC 354, consent of instructor.

MUSIC 454 Applied Music for Majors 1(0,1) Continuation of MUSIC 453. May be repeated on other performance media with departmental approval. Juried full recital performance is required. Applied music fee is assessed. *Preq:* MUSIC 453, consent of instructor.

MUSIC 480, 680 Advanced Music Technology 3(2,2) In depth coverage of current, cutting-edge music technologies, including, but not limited to, recording, digital audio, and sound reinforcement. *Preq:* MUSIC 180 or consent of instructor.

MUSIC 499, 699 Independent Studies 1-3(1-3,0) Tutorial work for students with special interests in music study outside the scope of existing courses. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

¹This course may be repeated for credit with a maximum of 16 hours of ensemble credit allowable toward a degree.

NONPROFIT LEADERSHIP

NPL 300 Foundations in Nonprofit Leadership 2(2,0) Students develop an understanding of historical and philosophical aspects of nonprofit organizations, as well as special skills needed to develop boards, recruit volunteers, raise funds, and manage day-to-day operations. Career development opportunities are also explored.

NURSING

Professors: B. Holaday, E. J. Lee, B. N. Logan, R. H. Pruitt, *Interim Director*; P. A. Smart, *Associate Professors:* M. Couillard, B. J. Holder, C. W. Lee, N. K. Meehan, V. G. Parker, S. W. Thompson, J. L. Timms, M. A. Wetsel, D. F. Willoughby; *Assistant Professors:* C. L. Belcher, R. L. Carr, J. A. Eggert, L. M. Gibson, L. A. Howe, *Lecturers:* P. A. Botchway, L. Crew, K. Dickey, J. S. Gillespie, E. N. Hatfield, E. R. Hearn, E. Swanson, J. E. Ward, M. J. Wohn; *Visiting Lecturer:* Y. Oka

NURS 140 Computer Applications in Health Care 3(3,0) [C.3] Introduction to the application of computers in the delivery of health care. Covers existing health-care applications and forecasts future needs. Multiple computer systems are discussed. Nursing majors will be given enrollment priority.

NURS 300 Seminar in Health Care Topics 1-4 (1-4,0-9) Individualized in-depth study in a selected health-care area; may have a clinical component and/or special projects. Open to non-Nursing majors. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

NURS 303 Nursing of Adults 7(3,8) Incorporates theoretical and empirical knowledge from physical and social sciences. Uses critical thinking to provide holistic, safe, individualized nursing care to adults, including health promotion, maintenance, restoration, and health teaching. *Preq:* NURS 304, 310, 312, 340. *Preq or Coreq:* NURS 320.

NURS 304 Pathophysiology for Health-Care Professionals 3(3,0) Focuses on disease mechanisms and recognition of the manifestations of these mechanisms in body systems. Discussion also includes pharmacologic and mechanical interventions commonly associated with specific disease processes and application to patient-care situations. *Preq:* BIOSC 223.

NURS 305 Psychosocial Nursing 3(3,0) Lifespan approach to examine psychosocial, developmental, family, and cultural factors that influence individuals from diverse populations and their families in the promotion, maintenance, and restoration of health. The use of the nursing process, critical thinking, therapeutic communication, and psychosocial nursing interventions is explored. *Preq:* Junior standing in Nursing.

NURS 307 Family Nursing in the Community 5(4,2) Bridge course for RN students focusing on nursing care of families including childbearing clients, infants, children, adolescents, adults, and older adults in the context of the community. Emphasis is on strategies to assist individuals in achieving or maintaining wellness in the family, home, and community environment. *Preq or Coreq:* NURS 313.

NURS 310 Health Assessment 3(2,2) Introduces concepts of health, wellness, and illness. Focuses on physical, psychosocial, and cultural assessment for the well adult client with variations across the lifespan. Includes interviewing techniques. *Preq:* All required non-nursing courses and electives.

NURS 311 Introduction to Community Nursing 2(2,0) Focuses on health promotion and illness prevention activities across the lifespan for individuals and families in the community. Major emphasis is on nursing's role in the acquisition and maintenance of health as well as the identification and modification of health risk factors. *Preq:* NURS 310, 312, 320. *Preq or Coreq:* NURS 304, 340.

NURS 312 Therapeutic Nursing Interventions 4(2,4) Focus on therapeutic nursing interventions, including selected psychomotor skills, communication skills, and teaching/learning. *Preq:* All required non-nursing courses and electives.

NURS 313 Health Assessment Through the Lifespan 4(3,2) Expands on RNs' knowledge of health assessment. Focuses on physical and psychosocial assessment for the well client throughout the lifespan. Interviewing techniques are included. *Preq:* Admission to RN/BS program.

NURS 317 Development of the Nursing Profession 3(3,0) Explores the evolution of nursing as a profession, the social and technological factors and challenges, struggles, and accomplishments of past nursing leaders. Includes strategies for effecting change based on experiences of the past.

NURS 318 Multidisciplinary Approach to End-of-Life Care 3(3,0) Integrates principles of care to increase comfort at the end of life, presented within a framework which encompasses the physical, psychosocial, and spiritual dimensions of an individual. Coursework also includes ethical and legal issues related to advance directives, reimbursement, and regulatory topics. *Preq:* PSYCH 201, SOC 201, or consent of instructor.

NURS 320, H320 Professionalism in Nursing 2(2,0) [W.1] Application of critical thinking skills in the professional nursing roles in multidisciplinary approaches to health care. Analysis of the historical development of modern nursing. Examination of issues of nursing care to diverse populations within context of ethical and professional standards. *Preq:* All required non-nursing courses and electives or consent of instructor.

NURS 323 Gerontology Nursing 2(2,0) Introduction of theories of aging. Focuses on complex health care issues of aging and chronic care including promotion, maintenance, and restoration of health of the elderly. Scientific concepts address physiological, psychological, and sociological issues of aging and chronic illness. *Preq:* NURS 310, 312, 320, PSYCH 201, SOC 201. *Preq or Coreq:* NURS 304, 340.

NURS 330, H330 Research in Nursing 3(3,0) [W.1] Introduction to conceptual frameworks, models, and theories related to nursing. Analysis of reported research in nursing and related disciplines. Ethical, moral, and legal issues are discussed in relation to nursing research. *Preq:* NURS 310, 312, 320 or admission to RN/BS program.

NURS 340 Pharmacotherapeutic Nursing Interventions 3(3,0) Focuses on the integration of nursing process with pharmacotherapeutics, administration, monitoring, and related client education. Includes major drug classifications, indications for use, side effects, interactions, routes of administration, usual dosages and contraindications. *Preq:* All required non-nursing courses and electives.

NURS (PHIL) 350 Technology and Philosophy in Nursing 3(3,0) Analysis of the influence of the increasing application of scientific technology to health-care delivery and concomitant ethical issues.

NURS 401 Mental Health Nursing 5(3,4) Application of theories and the nursing process to identify, implement, and evaluate nursing interventions for the care of clients with psychiatric disorders. *Preq:* All required 300-level nursing courses.

NURS 403 Complex Nursing of Adults 5(3,4) Focuses on the biological, psychological, philosophical, and socio-cultural influences on complex health problems related to acute and traumatic conditions. Emphasizes the concepts of circulation, oxygenation, homeostasis, and compensation in acutely ill adults. *Preq:* NURS 401, 411, 412.

NURS 405, H405 Leadership and Management in Nursing 3(2,2) [W.1] Focuses on the role of the professional nurse in managing nursing care. Theories and research related to leadership, power, management, organizations, regulation, and ethics are discussed. Directed laboratory experiences are provided. *Preq:* NURS 401, 411, 412, or admission to RN/BS program.

NURS 406 Issues in Professionalism 3(3,0) [W.1] Analysis of the development of professional nursing. Consideration of educational issues, legal and economic issues, health policy, leadership, cultural variations, and the influence of values in ethical decisions and nursing practice. *Preq:* Admission to RN/BS program.

NURS 408 Senior Nursing Practicum 3(1,4) Impact of selected health issues and problems on the practice of nursing is considered. Licensure preparation, techniques to maintain currency in the field, and other relevant topics facing the professional nurse are presented. Under preceptor supervision, students observe, organize, and implement entry level nursing practice. To be taken Pass/Fail only. *Preq:* NURS 401, 411, 412. *Coreq:* NURS 403, 415.

NURS 411 Nursing Care of Children 5(3,4) Focuses on child health problems and health maintenance. Emphasis is on biological, pathophysiological, psychological, and socio-cultural concepts related to nursing care of children with acute, critical, and chronic illnesses. Includes strategies for alleviation of illness, restoration of wellness, promotion and maintenance of health, growth, and development. *Preq:* All required 300-level Nursing courses.

NURS 412 Nursing Care of Women and Their Families 5(3,4) Emphasis is on biological, psychological, and socio-cultural concepts. Identification of appropriate nursing strategies that enhance individual capacity to achieve or maintain wellness in the family, home, community, and hospital environment. *Preq:* All required 300-level Nursing courses.

NURS 415 Community Health Nursing 4(2,4) Consideration of health promotion activities for family and community groups with emphasis on community assessment, screening, and health teaching/counseling. Practice activities are related to health promotion in population groups and nursing care of homebound clients. Laboratory settings include homes, schools, industries, and other community organizations. *Preq:* NURS 401, 411, 412, or admission to RN/BS program.

NURS H420 Senior Honors I 2(2,0) Students develop a proposal for a major thesis, directed study project, or research project under the guidance of a faculty preceptor. *Preq:* Senior Honors standing, NURS H330.

NURS H428 Senior Honors II 2(2,0) Students implement a proposal for a major directed study project or research thesis under the guidance of a faculty preceptor. *Preq:* Senior Honors standing, NURS H405, H420.

NURS 485 Nurse Extern Practicum 6(0,18) Practicum consisting of preceptor-supervised and faculty-led nursing clinical experiences in a regional health-care facility. *Preq:* Completion of at least one adult health and one pathophysiology course or consent of instructor.

NURS 499 Independent Study 1-4(1-4,0-9) In-depth study in an area of special interest in Nursing. Students develop specific objectives with a faculty member with expertise in the area of interest. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

NUTRITION

(See also courses listed under Animal and Veterinary Sciences, Biochemistry, and Food Science.)

Professors: J. A. Bertrand, A. B. Bodine II, K. L. Cason, T. C. Jenkins, M. E. Kunkel, D. V. Maurice; *Associate Professor:* V. J. Haley-Zitlin; *Assistant Professor:* M. D. Condrasky; *Lecturer:* R. M. Halliana

NUTR 203 Principles of Human Nutrition 3(3,0)
Principles of nutrition including functions, digestion, and requirements of nutrients; factors affecting food choices and dietary adequacy; and roles of nutrition in physical fitness and health maintenance. May not be substituted for NUTR 401.

NUTR 210 Nutrition and Physical Activity 3(3,0)
Topics include role of carbohydrates, fats, and proteins on energy utilization during exercise; altering body composition and improving fitness with diet and physical activity; importance of fluid intake on performance; effectiveness of dietary supplements and ergogenic aids; and choosing a diet appropriate for individual physical activity levels. *Preq:* BIOL 102 or equivalent.

NUTR 401, H401, 601 Fundamentals of Nutrition 3(3,0)
Biochemical and physiological fundamentals of nutrition applicable to domestic animals and man. Digestive processes and absorption and metabolism of carbohydrates, lipids, proteins, water, minerals, and vitamins are considered. Energy metabolism and comparative anatomy and physiology of digestive systems are discussed. *Preq:* BIOCH 305, CH 223, or consent of instructor.

NUTR 420 Selected Topics in Nutrition 1-3(1-3,0)
Comprehensive study of special topics in nutrition not covered in detail or contained in other courses. Current developments in each area are stressed. May be repeated for a maximum of three credits, but only if different topics are covered. *Preq:* Senior standing or consent of instructor.

NUTR 421 Special Problems in Nutrition 1-4 (0-3-12)
Independent research investigation in nutrition. Special emphasis is on developing a research proposal, conducting the research, and reporting the findings. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Senior standing or consent of instructor.

NUTR 424, 624 Medical Nutrition Therapy I 4(3,3)
Principles of nutritional assessment, education, and counseling skills; development of medical nutrition therapy for individuals with obesity and eating disorders, gastrointestinal disorders, metabolic and renal disorders. *Preq:* BIOSC 223, NUTR 451, or consent of instructor.

NUTR 425, H425, 625 Medical Nutrition Therapy II 4(3,1)
Development of medical nutrition therapy for individuals with various disease states including cardiovascular, hepatic, musculoskeletal, and neoplastic disorders; with consideration of sociocultural and ethnic aspects of food consumption and alternative nutrition therapies. *Preq:* BIOSC 223, NUTR 424, or consent of instructor.

NUTR 426, 626 Community Nutrition 3(3,0)
Study of fundamentals of nutrition care delivery in community programs beginning with assessment and problem identification and continuing through the development, implementation, and evaluation of nutrition intervention programs. *Preq:* NUTR 451 or equivalent or consent of instructor.

NUTR 451, H451, 651 Human Nutrition 3(3,0)
Essentials of nutrition and principle nutritional deficiency conditions. Factors affecting adequacy of dietary intake, methods of determining nutritional status, development of nutrition standards, and recent advances in human nutrition. *Preq:* BIOCH 305/306 or equivalent or consent of instructor.

NUTR 455, 655 Nutrition and Metabolism 3(3,0)
Concepts of metabolism fundamental to understanding normal and therapeutic nutrition are examined. Bioenergetics as well as metabolism of carbohydrates, lipids, amino acids, vitamins, and minerals as they relate to nutrition are discussed. *Preq:* NUTR 451 and BIOCH 305 or 423 or 406 or consent of instructor.

PACKAGING SCIENCE

Professors: J. H. Marcondes, R. L. Thomas, *Chair*; P. J. Vergano; *Associate Professors:* D. K. Cooskey, R. M. Kimmel; *Assistant Professors:* H. P. Bott, T. G. Weigel, W. S. Whiteside; *Adjunct Professor:* R. C. Cooskey; *Adjunct Associate Professors:* H. J. Park, J. J. Song; *Adjunct Instructor:* R. R. Perdue; *Adjunct Lecturers:* L. R. Byrne, R. J. Giangiori

PKGSC 101 Packaging Orientation 1(1,0)
Overview of the various principles and practices in packaging science, historical development, packaging as a career.

PKGSC 102 Introduction to Packaging Science 2(2,0)
Functions of a package; materials, processes, and technology used in package development; the relationship of packaging to the corporation, consumer, and society as a whole. *Preq:* PKGSC 101 or consent of instructor.

PKGSC 202 Packaging Materials and Manufacturing 4(3,3)
Detailed study of packaging materials including glass, metal, metal foils and sheets, wood, paper, paperboard, plastics, composites, adhesives, coatings, cushioning media; their functional properties in packaging application; laminating and combining of different packaging materials. *Preq:* PKGSC 102 or consent of instructor.

PKGSC 204 Container Systems (Rigid and Flexible) 3(3,0)
Examination of all the packages and containers used to develop systems to distribute products. Compatibility of product and package, structural design, costs, and merchandising considerations are stressed. *Preq:* PKGSC 202, 206 (or concurrent enrollment) or consent of instructor.

PKGSC 206 Container Systems Laboratory 1(0,3)
Laboratory practice in sample making, designing and constructing various containers. *Preq:* PKGSC 204 (or concurrent enrollment).

PKGSC 368, H368 Packaging and Society 3(3,0)
Study of the role of packaging in modern-day society. Responsibilities of the packager to protect people and the environment. Package guidelines recommended by civilian and governmental agencies. *Preq:* PKGSC 102 or consent of instructor.

PKGSC 401, 601 Packaging Machinery 3(3,0)
Systematic study of machinery used to form, fill, seal, laminate, combine, and print continuous and automated packaging lines and auxiliary material handling equipment, including principles of machine design, operation, selection, and specification. *Preq:* PKGSC 204, PHYS 207 or consent of instructor.

PKGSC 404, H404, 604 Mechanical Properties of Packages and Principles of Package Evaluation 3(3,0)
Study of the mechanical properties of packages, principles and standard methods (ASTM, TAPPI) of determining these properties. Evaluation of functional properties of packages including shock and vibration isolation. *Preq:* PHYS 207, PKGSC 204, or consent of instructor.

PKGSC (ED SC) 409 Total Quality Management for the Food and Packaging Industries 3(3,0)
See ED SC 409.

PKGSC 416, 616 Application of Polymers in Packaging 3(2,3)
Detailed study of polymer chemistry and polymerization technology. Emphasis is on polymers which are significant in packaging. Study includes polymer morphology, rheology, physical properties, and processing methods. *Preq:* PKGSC 204, 206; CH 201 or 223; PHYS 207; or consent of instructor.

PKGSC 420, 620 Package Design and Development 3(3,0)
Relationship between packaging and the marketing of consumer goods. Study of the various principles and methods practiced in developing packages, methods used to coordinate package development activities including interfacing with product development, manufacturing, marketing, and purchasing. *Preq:* PHYS 207, PKGSC 404, or consent of instructor.

PKGSC 421 Special Problems in Packaging Science 1-4(0,3-12)
Independent research investigations in packaging science related to packaging materials, machinery, design, and applications. Special emphasis is placed on organizing a research proposal, conducting research, and reporting results. May be repeated for a maximum of 15 credits. *Preq:* Consent of instructor.

PKGSC 422 Selected Topics in Packaging Science 1-3(1-3,0)
Comprehensive study of selected topics in packaging science not covered in detail or contained in other courses. Contemporary developments in each area are stressed. May be repeated for a maximum of 15 credits, but only if different topics are covered. *Preq:* Consent of instructor.

PKGSC 430, 630 Converting for Flexible Packaging 3(2,3)
Study of materials, methods, processes, and equipment used in converting web materials for flexible packaging. Laboratory provides hands-on experience preparing and operating pilot-scale converting equipment. *Preq:* PKGSC 416 or consent of instructor.

PKGSC 440, 640 Packaging for Distribution 3(3,0)
Delivery of a packaged product from point of manufacture to point of sale often involves several shipping methods, e.g., truck, rail, air, or ship. To assure both product protection and lowest cost, students must be familiar with the fundamentals of distribution packaging technology. *Preq:* Senior standing, consent of instructor.

PKGSC 454, 654 Package Evaluation Laboratory 2(0,6)
Laboratory experiments to determine properties of packaging materials and to evaluate the performance of packages including shipping tests (shock and vibration). Students learn how to operate standard testing apparatus and become familiar with industry-recognized test methods and standards. *Preq:* PKGSC 404 or consent of instructor.

PKGSC 464, H464, 664 Food Packaging Systems 3(3,0) Characteristics and application of various materials and systems used in the packaging of foods. Engineering properties of the materials and methods used to measure properties are emphasized. Consideration is given to packaging systems for specific food applications. *Preq:* Consent of instructor.

PKGSC 466, 666 Food Packaging Systems Laboratory 1(0,3) Laboratory and field exercises on food packaging operations and packaging materials. Methods to evaluate the physical and chemical properties of packaging materials are emphasized. *Preq:* Consent of instructor.

PKGSC 471, 671 Wood and Paper Packaging 3(3,0) In-depth study of use of wood and paper in packaging. Covers characterization of raw materials, basic conversion processes, and the use of converted products in packaging. Emphasis is on the relationship between structure, processing, and properties. *Preq:* PKGSC 102 or consent of instructor.

PARKS, RECREATION, AND TOURISM MANAGEMENT

Professors: L. R. Allen, S. J. Backman, R. H. Becker, G. W. Burnett, L. W. Gahan, W. E. Hammitt, G. E. Howard, A. E. James, F. A. McGuire, R. W. McLellan, Chair; J. R. Pope, Jr.; *Associate Professors:* H. J. Grove, J. M. McDonald, M. K. McLellan, T. D. Potts, C. R. White, Jr.; *Assistant Professors:* K. F. Backman, R. D. Bixler, W. C. Norman; *Lecturer:* B. W. Stevens

PRTM 101 Concepts of Leisure 3(3,0) Introduces recreation professions and organizations: government, voluntary, and commercial. Overviews professional preparation. Outlines development of man's uses of leisure and evolution of recreation, city parks, natural resources conservation, and preservation movements as philosophical forces affecting leisure services. Restricted to Parks, Recreation, and Tourism Management majors.

PRTM 201, H201 The Recreation/Leisure Environment 3(3,0) Discusses the development characteristics of built and natural environmental resource settings for recreation, tourism development, and community expression. Examines human/environment interactions during leisure, including the impact of the recreation environment on people and the impact of people on the recreation environment. Surveys public agencies and private interests in these settings.

PRTM 205 Program and Event Planning 3(3,0) Principles and methods of program development. Time and facility utilization for sports activities, social functions, arts and crafts, outdoor activities, hobbies or special-interest groups, and activities in the cultural and performing arts are pursued. *Preq:* PRTM 101.

PRTM 206 Practicum I 1(0,3) Students conduct a recreation program in a supervised setting. A minimum of 90 hours with a leisure agency approved by the University is required. To be taken Pass/Fail only. *Preq:* PRTM 205, Sophomore standing in Parks, Recreation, and Tourism Management.

PRTM 207 Practicum II 1(0,3) Continuation of PRTM 206. Experience in a leisure situation different from the PRTM 206 exposure. A minimum

of 90 hours with a leisure agency approved by the University is required. To be taken Pass/Fail only. *Preq:* PRTM 205, Sophomore standing in Parks, Recreation, and Tourism Management.

PRTM (FOR) 209 Professional Application of Microcomputers 3(1,4) [C,3] Basic competencies in and professional application of the following areas are realized: GUI, word processing, databases, spreadsheets, graphics, and electronic communication. Legal and ethical issues of computer use and information access and exchange are also presented. Majors in Parks, Recreation, and Tourism Management or Forest Resources will be given enrollment priority.

PRTM 210 Serving Diverse Populations in Parks, Recreation, and Tourism Management 3(3,0) Introduces students to the leisure patterns and constraints of diverse constituents, including members of ethnic and racial minorities, people of diverse socio-economic status, women, older adults, people with disabilities, and people with alternative lifestyles. *Preq:* PRTM 101.

PRTM 241 Introduction to Community Recreation Management 3(3,0) Community recreation is examined conceptually to include the history and structure of public and private non-profit recreation agencies with an emphasis on programs and services, career opportunities, funding mechanisms, the role of government, and current trends and issues impacting the delivery of services. *Preq:* PRTM 101.

PRTM 254 Introduction to Sport Management 3(3,0) Development of a conceptual understanding of sport management, career opportunities in sport management, and the necessary competencies for the different career fields.

PRTM 270, H270 Introduction to Recreation Resources Management 3(3,0) Fundamentals of recreation resources management are presented to include the framework of management, management of specific resources, management of visitors, and management of services.

PRTM 281 Introduction to Golf Management 3(3,0) Development of a conceptual understanding of the golf industry, career opportunities in professional golf management, and specific introductory competencies utilized within the field. *Preq:* Professional Golf Management concentration and consent of instructor.

PRTM 301 Recreation and Society 3(3,0) Investigation of the role of recreation in a technological and work-oriented society. Particular emphasis is on recreation behavior, resources, and programming in public and private organizations which serve the public wants. Not open to Parks, Recreation, and Tourism Management majors; may not be substituted or otherwise used to meet Parks, Recreation, and Tourism Management area requirements. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 304 Challenge Course Facilitation 3(2,2) Develops knowledge and skill in planning, directing, and evaluating group performance in an adventure challenge course environment; emphasis is placed on low and high ropes elements, processing, assessment, safety, and course management. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 305 Safety and Risk Management in Parks, Recreation, and Tourism Management 3(3,0) Provisions of safe services, facilities, and activities in the parks, recreation, and tourism domain are studied through the application of germane concepts from the areas of safety, risk management, and liability. *Preq:* PRTM 321, Junior standing, 2.0 cumulative grade-point ratio.

PRTM 307 Facility Planning and Operations 3(3,0) Introduction to recreation facility planning and operations processes. Design, planning, financing, construction, budgeting, personnel, operating policies and procedures, maintenance, and equipment considerations are covered.

PRTM 308, H308 Leadership and Group Processes in Recreation 3(3,0) Leadership is analyzed through experience-based learning. Various styles of leadership and communication and their probable consequences are examined. Techniques for planning large and small group meetings are considered. Examination is made of literature in the field of leadership and group processes. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 309 Behavioral Concepts in Parks, Recreation, and Tourism 3(3,0) Studies social psychological concepts concerning leisure behavior in various park, recreation, and tourism settings. Students learn to apply those theories and behavioral concepts required to understand and manage leisure activities and environments. *Preq:* PRTM 101; PSYCH 201 or SOC 201; 2.0 cumulative grade-point ratio; consent of instructor.

PRTM 311, H311 Therapeutic Recreation 3(3,0) Examination of the profession of therapeutic recreation by analyzing the history, philosophy, concepts, roles, and functions involved in the therapeutic recreation services. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 314 Therapeutic Recreation Interventions I 1(0,3) Experiential examination of program interventions used with mental health, chemically dependent, and related populations. *Preq:* PRTM 101, 2.0 cumulative grade-point ratio.

PRTM 315 Therapeutic Recreation Interventions II 1(0,3) Experiential examination of program interventions used with physically disabled and other populations. *Preq:* PRTM 314, 2.0 cumulative grade-point ratio.

PRTM 317 Group Initiatives 3(2,2) Examination and development of initiative modalities used by therapeutic recreators to teach teamwork, problem solving communication, goal setting, leadership and personal interaction to diverse populations in a variety of settings. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 318 Leisure Lifestyle Management 3(3,0) Examines principles and techniques applicable to guiding disabled as well as nondisabled individuals in an exploration of leisure needs, barriers, consequences, and accessibility. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 320, H320 Recreation Policymaking 3(3,0) Structures and processes for public park and/or recreation policy formation in the United States. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 321, H321 Recreation Administration 3(3,0) Analysis of the internal organization of a recreation department dealing with finances and accounting, records and reports, publicity and public relations, state and federal legislation, staff organization, coordination of community resources. *Prq:* PRTM 308, Junior standing, 2.0 cumulative grade-point ratio.

PRTM 330, H330 Visitor Services and Interpretation 3(3,0) Introduction to the philosophy and principles of the art of environmental interpretation. Comprehensive survey of interpretive theory as it applies to the recreation and parks practitioner and the varying settings within the profession. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 342, H342 Introduction to Tourism 3(3,0) Survey of travel and tourism in the United States with focus on terminology, demographics, financial significance, and trends. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 343 Spatial Aspects of Tourist Behavior 3(3,0) Spatial patterns of national and international leisure travel destinations are explored and analyzed regarding their tourism attractiveness. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 344 Tourism Markets and Supply 3(3,0) Acquaints students with the principles of matching tourism markets and supply. Students examine the strategies used in developing markets. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 349 Survey of Tourism Sites 1(0,3) On-site study of various exemplary components of the travel and tourism industry in the Southeast. There are additional costs to students to cover travel. To be taken Pass/Fail only. *Prq:* PRTM 342, Junior standing in Parks, Recreation, and Tourism Management, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 352 Camp Organization and Administration 3(2,3) Surveys the development and trends of camping in America. Considers programming for the operations of agency and private camps. Enables students to master the techniques of group living. Laboratory offers practical experience in camp craft including trips and outdoor cooking. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 390 Independent Study in Parks, Recreation, and Tourism Management 1-3(1-3,0) Comprehensive studies and investigation of special topics not covered in other courses. Emphasis is on field studies, community service, and independent readings. May be repeated for a maximum of three credits. *Prq:* Junior standing, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 391 Selected Topics in Parks, Recreation, and Tourism Management 2-3(2-3,0) In-depth examination of developing trends in parks, recreation, and tourism that warrant timely study. May be repeated twice for a maximum of six credits, but only if different topics are covered. *Prq:* Junior standing, 2.0 cumulative grade-point ratio.

PRTM 403 Elements of Recreation and Park Planning 3(3,0) Basic recreation and park planning principles, processes, and trends in area and facility development combine to form the basis for formulation of a relevant knowledge of planning. *Prq:* Senior standing, 2.0 cumulative grade-point ratio.

PRTM 404 Field Training I 1(1,0) Preparation for field training experience including topics such as résumé development, interviewing techniques, internship agency selections, and responsibilities of the student, department, and agency. To be taken Pass/Fail only. *Prq:* PRTM 206, 207 (or concurrent enrollment), 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 405 Field Training II 6(0,18) Minimum ten weeks (400 hours) of uninterrupted, supervised work in a park, recreation, or tourism management agency. Under agency supervision, students observe, organize, and implement activities, events, and programs. To be taken Pass/Fail only. *Prq:* PRTM 206, 207, 404; Senior standing in Parks, Recreation, and Tourism Management; 2.0 cumulative grade-point ratio; consent of instructor.

PRTM 409 Methods of Recreation Research 1 3(3,0) Analysis of the principal methods of recreation research, the application of descriptive statistics to recreation research, and the development of a research proposal. *Prq:* Senior standing in Parks, Recreation, and Tourism Management; 2.0 cumulative grade-point ratio.

PRTM 410, H410 Methods of Recreation Research II 3(3,0) Continuation of PRTM 409; includes supervised execution and reporting of results of research proposal developed in PRTM 409 and the application of inferential statistics to research. *Prq:* PRTM 409, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 412, H412, 612 Therapeutic Recreation and Mental Health 3(3,0) Therapeutic recreation services in mental health clinics, institutions, and outdoor settings. Review of disorders and current modes of treatment as they relate to therapeutic recreation. *Prq:* PRTM 311, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 413, 613 Recreation Therapy in Physical Rehabilitation 3(3,0) Examination of the potential psychological, physical, and sociological implications of disability to the individual and to the planning and directing of therapeutic recreation services. *Prq:* PRTM 311, three credit hours of human anatomy and physiology, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM (ED SP) 414, 614 Recreation and Leisure for Special Populations 3(3,0) Provides class participants with practical experience in designing recreation and leisure activities for special populations (e.g., handicapped, elderly). *Prq:* 2.0 cumulative grade-point ratio.

PRTM 416 Leisure and Aging 3(3,0) Examines the role of leisure services in later life, the needs of community-based and institutionalized elderly, and the development of service-delivery systems to meet those needs. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 417 Therapeutic Recreation Processes I 4(3,2) Examination of models, principles, and procedures applicable to comprehensive program planning, specific program plans, individualized care plans, activity analysis, documentation, and evaluation. *Prq:* PRTM 311 or consent of instructor, three credit hours of human anatomy and physiology, 2.0 cumulative grade-point ratio.

PRTM 418 Therapeutic Recreation Processes II 4(3,2) Examination of theories and concepts that guide therapeutic recreation interventions, including knowledge and use of communication skills, therapeutic relationships, counseling theories, and group processing techniques. *Prq:* PRTM 311 and 417 or consent of instructor, 2.0 cumulative grade-point ratio.

PRTM 420 Therapeutic Recreation Trends and Issues 3(3,0) Advanced principles and practices of therapeutic recreation, including philosophy, ethics, professional development, standards of practice, certification, recreation inclusion, and marketing services. *Prq:* PRTM 416, 418 or consent of instructor, 2.0 cumulative grade-point ratio.

PRTM 421, H421, 621 Recreation Financial Resources Management 3(3,0) Analysis of recreation financial resources management. Deals with revenue sources and their allocation. *Prq:* PRTM 321, Senior standing in Parks, Recreation, and Tourism Management; 2.0 cumulative grade-point ratio.

PRTM (GEOG) 430, 630 World Geography of Parks and Equivalent Reserves 3(3,0) Major international patterns in the provision and use of urban and rural parks and recreation are examined. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 431, 631 Methods of Environmental Interpretation 3(2,3) Practice and instruction in the use of equipment and methods available to the interpreter in public contact work. Coaching in presentation and evaluation of live programs and in design, execution, and evaluation of mediated programs is the major emphasis. Programs are delivered to public audiences in the Clemson area. *Prq:* PRTM 330; Senior standing in Parks, Recreation, and Tourism Management; 2.0 cumulative grade-point ratio; consent of instructor.

PRTM 441, 641 Commercial Recreation 3(3,0) Components of offering leisure services and products to the public by individuals, partnerships, and corporations for the purpose of making a profit. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 443, 643 Resorts in National and International Tourism 3(3,0) A variety of resort types are studied with respect to their development, organization, visitor characteristics, and environmental consequences. A case-study approach is used. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 444, 644 Tour Planning and Operations 3(3,0) Provides the opportunity to understand the psychology of touring, with emphasis on packaged and group tours and how tours of different types and scale are planned, organized, marketed, and operated. *Prq:* PRTM 342, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 445, 645 Conference/Convention Planning and Management 3(3,0) Provides the opportunity to understand the problems of and solutions to conference and convention planning and management from both the sponsoring organization's and facility manager's perspectives. *Prq:* 2.0 cumulative grade-point ratio.

PRTM 446, 646 Community Tourism Development 3(3,0) Provides a community-based perspective of organizational, planning, development, and operational needs for a successful tourism economy at the local level. *Prq:* PRTM 342, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 447, 647 Perspectives on International Travel 3(3,0) Using the United States as a destination, international travel patterns and major attractions are presented. Factors which restrain foreign travel to the United States are analyzed. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 452, 652 Campus Recreation 3(3,0) Study of the basic components required for administration of successful college union and intramural-recreation sport programs. *Preq:* 2.0 cumulative grade-point ratio.

PRTM 453 Sports Information and Event Management 3(3,0) Introduction to basic techniques, tools, and procedures associated with sports information and event management activities. Focuses on the application of sports information and event management activities building upon knowledge from personal interviews, selected readings, event management brochures and field experience. *Preq:* PRTM 254, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 454 Trends in Sport Management 3(3,0) Examination of trends in the sport management area that allows PRTM majors to obtain an updated knowledge base of the field. Students are able to relate their academic studies to the current trends, problems, and management strategies confronting and being used within the sport management industry. *Preq:* PRTM 254, 2.0 cumulative grade-point ratio, consent of instructor.

PRTM 474, H474 Advanced Recreation Resources Management 3(3,0) Advanced topics in recreation resource management focusing on management strategies and techniques for addressing common resource and social problems in recreation resource management. Case studies and problem analysis are emphasized. *Preq:* Senior standing, 2.0 cumulative grade-point ratio.

PRTM 483 Golf Club Management and Operations 3(0,9) Focuses on activities related to merchandising, purchasing and selling, inventory management, vendor selection, pricing strategies, strategies for monitoring sales and inventory related to financial control and customer service. Students are exposed to the responsibilities of a golf professional at a full-service golf club facility. *Preq:* Concurrent enrollment CO-OP 104, 105.

PRTM 490 Senior Independent Study 1-3(1-3,0) In cooperation with and under supervision of a faculty member, students develop and execute a field study or community project. May be repeated twice for a maximum of three credits. *Preq:* Senior standing in Parks, Recreation, and Tourism Management or consent of instructor.

PERFORMING ARTS

Professors: R. E. Goodstein, *Chair*; C. S. M. Egan, L. U. Harder, D. J. Hartmann, D. R. Rash, R. C. Sawyer; *Associate Professors:* N. M. Hosler, A. R. Levin; *Assistant Professors:* P. L. Buyer, H. Currie, L. Dzuris, K. Johnson, L. L. Li-Bleul, M. J. Spede; *Lecturers:* G. S. Alewine, M. T. Anderson, E. J. Austin, C. A. Collins, P. G. Elliott, J. B. Fankhauser, T. Hayden, J. H. Merrell, D. Owens, M. G. Rowell, S. M. Sawyer, H. R. Spires, D. E. Stevenson, W. H. Thomas, C. Ulrich, B. A. Whisler, W. H. Zaros

P A 101 Introduction to Performing Arts 3(2,3) Overview of performing arts including performance, careers, technology, production, management, community outreach, safety, sales, and marketing. *Preq:* Performing Arts major.

P A 201 Performing Arts Seminar I 1(0,3) Study of selected performing arts topics. Includes seminars and masterclasses with faculty and visiting artists and concert and theatre attendance and evaluation. Emphasis is placed on written communication skills. *Preq:* P A 101, Sophomore standing.

P A 279 Performing Arts Laboratory 1(0,3) Practical work on performing arts presentations including backstage technical work, multimedia support, and arts management. May be repeated for a maximum of four credits. *Preq:* P A 101.

P A 301 Performing Arts Seminar II 1(0,3) Continuation of P A 201 with added focus on critical and ethical analysis of performing arts. Emphasis is placed on oral communication skills. *Preq:* P A 201, Junior standing.

P A 399 Internship 1-3(0,3-9) Provides performing Arts majors an opportunity to apply technical, managerial, and artistic concepts in a performing arts environment through preplanned, preapproved, faculty-supervised internships. Minimum of 45 hours of work per credit hour. May be repeated for a maximum of six credits. To be taken Pass/Fail only. *Preq:* P A 279 and consent of Internship Program Coordinator.

P A 401 Senior Project Research 1(0,3) Performing Arts students research a substantial project for the community. Interdisciplinary performing arts group generates a proposal for P A 402. May be repeated for a maximum of two credits. *Preq:* P A 301, Senior standing.

P A 402 Senior Project 3(0,9) Capstone course for Performing Arts majors. Preparation, execution, and assessment of a substantial group performing arts project for the community. Students, with faculty guidance, manage all aspects of the project. *Preq:* P A 401 with a B or better, Senior standing.

PHILOSOPHY

Professors: W. A. Maker, *Chair*; T. G. May, S. Silvers; *Associate Professors:* T. J. Oberdan, S. A. Satris, K. C. Smith, D. E. Wueste; *Assistant Professor:* C. B. Starkey; *Lecturers:* D. L. Segall, W. S. Watson

PHIL 101, H101 Introduction to Philosophical Problems 3(3,0) Discussion of representative philosophical questions which arise from human thought and action. Characteristic topics are values, knowledge, human nature, and society.

PHIL 102, H102 Introduction to Logic 3(3,0) Introduction to methods of evaluating arguments. Simple valid argument forms are given which can be joined together to produce the logical form of virtually any argument. Informal fallacies may also be considered.

PHIL 103, H103 Introduction to Ethics 3(3,0) Philosophical consideration of the nature of ethics, basic ethical issues, and problems and modes of ethical reasoning.

PHIL 105 Introductory Seminar in the Big Questions 3(3,0) Introductory seminar dealing with a single important philosophical question ("Who are we?" "What is the meaning of life?" "Are we free or determined?" etc.). Question is pursued throughout the semester with active student involvement. Questions may vary from semester to semester.

PHIL 201 Responsibilities in Leadership 3(3,0) Exploration of the responsibilities leaders have to those who are being led, to those on whose behalf they are leading, to those affected by leadership decisions and actions. Focuses on the relationship between responsibility and authority and the role of judgment in the exercise of leadership.

PHIL 225 Art and Logic of Scientific Reasoning 3(3,0) Examines applications and misapplications of inductive reasoning and causal inference in scientific explanation and everyday discourse. Topics include correlation and confirmation, natural laws, natural kinds, scientific explanation, causal inference, and experimental methods.

PHIL 303 Philosophy of Religion 3(3,0) Critical consideration of the meaning and justification of religious beliefs. Representative topics are the nature and existence of God, religious knowledge, religious language, the problem of evil.

PHIL 304 Moral Philosophy 3(3,0) Study of moral problems, their origin in conflicts between duty and desire, and alternative solutions proposed by classical and contemporary writers.

PHIL (CHIN) 312 Philosophy in Ancient China 3(3,0) Study of the history of Chinese philosophy from fifth century B.C.E., including Confucianism, Daoism, Moism, legalism, Buddhism, Neo-Daoism and Neo-Confucianism. Examination of Chinese philosophers' views and arguments on questions of life and death, history and society, education and personal cultivation. May not be used to satisfy general foreign language requirements.

PHIL (CHIN) 313 Philosophy in Modern China 3(3,0) Study of the history of Chinese philosophy from the 19th century to the present including Neo-Confucianism, Conservatism, Liberalism, Nationalism, and Chinese Marxism. Examination of the conflict and fate of traditional and modern values in China. All readings and discussions are in English. May not be used to satisfy general foreign language requirements.

PHIL 314 Comparative Topics in Eastern and Western Philosophy 3(3,0) Study of issues and areas of overlapping concern to Eastern and Western philosophical traditions (e.g., ontology, ethics) with emphasis on both contrasts and convergences in philosophical approaches. Topics may vary.

PHIL 315 Ancient Philosophy 3(3,0) Origins and development of rationality as found in the thought of selected philosophers such as Socrates, Plato, and Aristotle.

PHIL 316 Modern Philosophy 3(3,0) Development of the modern view as seen in major Western philosophers of the 16th, 17th, and 18th centuries. Thought of Berkeley, Descartes, Hume, Leibniz, Locke, and Spinoza may be considered to illustrate the development of rationalism and empiricism.

PHIL 317 Nineteenth-Century Philosophy 3(3,0)

Development of 19th-century philosophy with emphasis on selected works of philosophers such as Kant, Hegel, Marx, Nietzsche, and Kierkegaard.

PHIL 318 Twentieth-Century Philosophy 3(3,0)

Study of the dominant movements in Western philosophy today, particularly existentialism and analytical philosophy. The object is to acquire sufficient background for reading current philosophical or philosophically-influenced literature.

PHIL 320 Social and Political Philosophy 3(3,0)

Critical consideration of the views of some major philosophers on the nature of the individual's relation to society and the state in the context of their wider philosophical (logical, epistemological, metaphysical, and ethical) doctrines. Philosophers may include Plato, Aristotle, Augustine, Hobbes, Rousseau, Mill, Marx, Hegel, Rawls, and Nozick.

PHIL 321 Crime and Punishment 3(3,0)

Investigates what sorts of conduct should be criminalized and what society should do with those who engage in criminal activity. Specific topics may include the enforcement of morals, euthanasia, hate crimes, deterrence, retribution, and restitution.

PHIL 323 Theory of Knowledge 3(3,0)

Examination of concepts, criteria, and decision procedures underlying rational belief and the justification of knowledge claims. Representative answers to the problem of skepticism are considered, with special attention to some leading theories of knowledge.

PHIL 324 Philosophy of Technology 3(3,0)

Examines technology and representative philosophical assessments of it with a focus on understanding its impact on the human condition.

PHIL 325 Philosophy of Science 3(3,0)

Philosophical study of problems generated by science, but which are not themselves scientific, such as what comprises a scientific theory; how scientists formulate theories and acquire knowledge; what, if anything, differentiates science from other ways of knowing; what role concepts play in scientific knowledge; and whether scientific progress is rational.

PHIL 326 Science and Values 3(3,0)

Examination of several features of the relation between science and values. Topics may include ethical and social obligations of scientists, role of value judgments in scientific practice, and influence of social and political values on science and scientists.

PHIL 327 Philosophy of Social Science 3(3,0)

Inquiry into the philosophical foundations of social science, in particular questions of objectivity, explanatory structure, causality, agency, normativism and naturalism, and social determination of knowledge.

PHIL 330 Contemporary Issues in Philosophy 3(3,0)

Examination of a variety of issues of broad concern to philosophers today. Issues may vary. May be repeated once for credit with departmental consent.

PHIL 333 Metaphysics 3(3,0)

Examination of issues and problems concerning the ultimate nature of reality. Topics may include the appearance/reality distinction, the nature of existence, freedom and determinism, personal identity, idealism, and realism.

PHIL 343 Philosophy of Law 3(3,0) Explanation of the nature of legal theory and the law through a critical examination of the basic concepts and principles of these fields.

PHIL 344 Business Ethics 3(3,0) Study of ethical issues created by business activities, relating them to fundamental questions of ethics generally. Representative topics may include hiring, firing, promotions, business and minorities, organizational influence in private lives, consumer interests, economic justice, and reindustrialization.

PHIL 345 Environmental Ethics 3(3,0) Study of ethical problems in our dealings with the rest of nature and of how they relate to ethics in general. Representative topics include the basis of ethics, nature and intrinsic value, duties to future generations, economics and the environment, rare species, animal rights, ethics and agriculture, energy doctrine.

PHIL 346 Medical Ethics 3(3,0) Examines ethical dilemmas facing modern medicine. Topics may include controversies surrounding death, reproductive technologies, abortion, allocation of resources, the concept of disease, the doctor-patient relationship, and medical research.

PHIL 347 Ethics in Architecture 3(3,0) Interdisciplinary course focused on the architectural profession and the practices of design, building, and other processes in a social and business context. Consideration is given to both general moral principles and particular case studies.

PHIL 348 Philosophies of Art 3(3,0) Examines some of the predominant attempts to understand art in ancient and modern philosophy and also considers a variety of contemporary views and controversies about the nature, meaning, value, and future of art.

PHIL (NURS) 350 Technology and Philosophy in Nursing 3(3,0) See NURS 350.

PHIL 355 Philosophy of Mind and Cognitive Science 3(3,0) Critical examination of philosophical and scientific theories of mental phenomena and of the relationship between mental and material phenomena. Theories of Mind-Body Dualism, Monism, Functionalism, Eliminative and Reductive Materialism, Connectionism, and the status of folk psychology versus cognitive neuroscience are studied.

PHIL 360 Symbolic Logic 3(3,0) Introduction to the basic concepts of modern symbolic logic, including the symbolization of statements and arguments and the techniques of formal proof.

PHIL 370 Philosophy of War 3(3,0) Examines war from both ethical and strategic perspectives: the nature of a just war, the aims of war, and the kinds of general strategies appropriate for achieving those aims.

PHIL 375 Minds and Machines 3(3,0) Examines controversial questions in artificial intelligence and the Computational Theory of Mind. Topics: "Can machines think?" "What's involved in being able to think?" "Can machines reason, understand, be conscious, be self-aware, learn, be creative, have emotions, and use natural language?" Focus is on manmade computers and the mind as computer.

PHIL (REL) 393 Science and Religion 3(3,0) See REL 393.

PHIL 401, 601 Studies in the History of Philosophy 3(3,0) In-depth study of a selected philosopher, philosophical school, or movement. Topics vary. With departmental consent, may be repeated once for credit. Current topics and course descriptions are available in the department's course offering brochure. *Preq:* Consent of instructor.

PHIL 402, 602 Topics in Philosophy 3(3,0) Thorough examination of a particular philosophical topic, issue, or problem. Topics vary. May be repeated once for credit with departmental consent. Current topics and course descriptions are available in the department's course offering brochure. *Preq:* Consent of instructor.

PHIL 406, 606 Continental Philosophy for Architects 3(3,0) Examines contemporary Continental philosophy over the course of the 20th century with the goal of offering the proper theoretical background to architecture students who use such theory in their studies and design work.

PHIL 425, 625 Philosophy of Psychology 3(3,0) Detailed examination of psychology as an autonomous science. Issues include explanation in psychology and cognitive neuroscience, psychology naturalized as a "special science" comparable to biology and geology, evolutionary psychology, philosophy and psychopathology, and moral issues in psychology. *Preq:* Nine hours of psychology or consent of instructor.

PHIL (A A H) 433, 633 Issues in Contemporary Art and Philosophy 3(3,0) Examines the intersections between recent developments in art and those in philosophy and critical theory. Course content varies, for example, Postmodernism in Art and Philosophy, Themes of Resistance in Contemporary Culture.

PHIL 485, 685 Topics in Philosophy of Biology 3(3,0) Detailed analysis of a selected topic in philosophy of biology/theoretical biology. Topics may include the levels of selection debate, sociobiology, genetic explanation and genetic causation, the species question, and the history and sociology of biology. *Preq:* Eight credit hours of biology or consent of instructor.

PHIL 499 Independent Study 1-3(1-3,0) Course of study designed by the student in consultation with a faculty member who agrees to provide guidance, discussion, and evaluation of the project. Student must confer with the faculty member prior to registration. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

PHYSICAL SCIENCE

PH SC 107 Introduction to Earth Science 4(3,3)

Survey of topics in geology, meteorology, astronomy, and oceanography emphasizing comprehension and practical application of earth science concepts to experiments and activities appropriate for the elementary school classroom. Enrollment priority will be given to Early Childhood and Elementary Education majors.

PH SC 108 Introduction to Physical Science 4(3,3)

Survey of topics in chemistry and physics emphasizing comprehension and practical application of physical science concepts to experiments and activities appropriate for the elementary school classroom. Enrollment priority will be given to Early Childhood and Elementary Education majors.

PHYSICS

Professors: P. A. Barnes, Chair; D. D. Clayton, M. S. Daw, L. L. Larcom, M. F. Larsen, M. D. Leising, P. J. McNulty, J. R. Manson, J. W. Meriwether, B. S. Meyer, T. M. Tritt; *Associate Professors:* P. J. Flower, D. H. Hartmann, H. Jiang, J. C. King, A. M. Rao; *Assistant Professors:* P.-C. Ke, G. A. Lehmacher, D. C. Marinescu, C. E. Sosolik

PHYS 101 Current Topics in Modern Physics 1(0,2) Demonstrations and lectures serving as an introduction to different areas of physics and astronomy are presented by various members of the staff. May include such topics as astrophysics, energy, relativity, and weather, as well as visits to the planetarium.

PHYS 122, H122 Physics with Calculus I 3(3,0) First of three courses in a calculus-based physics sequence. Topics include vectors, laws of motion, conservation principles, rotational motion, oscillations, and gravitation. Credit for a degree will be given for only one of PHYS 122, 200, or 207. *Coreq:* MTHSC 108.

PHYS 124 Physics Laboratory I 1(0,3) Introduction to physical experimentation with emphasis on mechanical systems, including oscillatory motion and resonance. Computers are used in the experimental measurements and in the statistical treatment of data. *Coreq:* PHYS 122.

PHYS 200 Introductory Physics 4(3,2) Introduction to classical physics. Includes elements of mechanics, heat, electricity, and light. May not be substituted for PHYS 122 but may be substituted for PHYS 207, only with the approval of the Department of Physics and Astronomy. Credit for a degree will be given for only one of PHYS 122, 200, or 207. *Coreq:* MTHSC 105 or equivalent.

PHYS 207 General Physics I 4(3,2) Introductory course for students who are not majoring in physical science or engineering. Covers such topics as mechanics, waves, fluids, and heat. Credit for a degree will be given for only one of PHYS 122, 200, or 207. *Coreq:* Course that includes algebra and trigonometry.

PHYS 208 General Physics II 4(3,2) Continuation of PHYS 207. Covers such topics as electricity, magnetism, electromagnetic waves, optics, and modern physics. Credit for a degree will be given for only one of PHYS 208 or 221. *Preq:* PHYS 207.

PHYS 221, H221 Physics with Calculus II 3(3,0) Continuation of PHYS 122. Topics include thermodynamics, kinetic theory of gases, electric and magnetic fields, electric currents and circuits, and motions of charged particles in fields. Credit for a degree will be given for only one of PHYS 208 or 221. *Preq:* PHYS 122.

PHYS 222, H222 Physics with Calculus III 3(3,0) Continuation of PHYS 221. Topics include wave motion, electromagnetic waves, interference and diffraction, relativity, atomic particles, and atomic and nuclear structure. *Preq:* PHYS 221.

PHYS 223 Physics Laboratory II 1(0,3) Experiments in heat and thermodynamics, electrostatics, circuits, and magnetism. Computers are used in statistical treatment of data. *Coreq:* PHYS 221.

PHYS 224 Physics Laboratory III 1(0,3) Experiments involve atomic, molecular, and nuclear systems. Wave particle duality of light and matter is emphasized. Calculators and computers are used in statistical treatment of data. *Coreq:* PHYS 222.

PHYS 240 Physics of the Weather 3(3,0) Descriptive introduction to meteorology. Includes atmospheric thermodynamics, solar radiation, heat budget, atmospheric circulation, force laws governing air motion, fronts, precipitation, synoptic prediction. Special topics of current interest such as the effect of environmental pollution on weather and the effect of weather on health are included.

PHYS 262 Physics of Music 3(3,0) Elementary, nontechnical study of the relationship between the laws of physics and the production of music for the music student or layman who wishes to understand the physical principles of the art. Topics include mechanical and acoustical laws, harmonic analysis, musical scales, sound production in instruments, physiology of hearing, etc.

PHYS 290 Physics Research 1-3(0,3-9) Individual research project in any area of experimental or theoretical physics or astronomy; supervised by a physics or astronomy faculty member. Project need not be original but must add to students' ability to carry out research. May be repeated for a maximum of six credits. *Preq:* Minimum grade-point ratio of 3.0; consent of instructor.

PHYS 300, H300 Introduction to Research 1(2,0) Acquaints students with current research in physics. Seminars are provided where research activities in various areas of physics and astronomy are summarized. Provides a basis for students to choose a suitable topic for a senior thesis. *Preq:* Junior standing in Physics.

PHYS 311 Introduction to the Methods of Theoretical Physics 3(3,0) Survey of methods and techniques of problem-solving in physics. Emphasizes the application of mathematical techniques to the solution of problems of vectors, fields, and waves in mechanics, electromagnetism, and quantum physics. *Preq:* PHYS 222 or consent of instructor.

PHYS 321, H321, 621 Mechanics I 3(3,0) Statics, motions of particles and rigid bodies, vibratory motion, gravitation, properties of matter, flow of fluids. *Preq:* PHYS 221.

PHYS 322, H322, 622 Mechanics II 3(3,0) Dynamics of particles and rigid bodies, Lagrangian and Hamiltonian formulations, vibrations of strings, wave propagation. *Preq:* PHYS 321 or consent of instructor.

PHYS 325, H325, 625 Experimental Physics I 3(1,4) Introduction to experimental modern physics, measurement of fundamental constants, repetition of crucial experiments of modern physics (Stern-Gerlach, Zeeman effect, photoelectric effect, etc.). *Coreq:* PHYS 321 or consent of instructor.

PHYS 326, H326, 626 Experimental Physics II 3(1,4) Continuation of PHYS 325.

PHYS 355, H355 Modern Physics 3(3,0) Study of the topics of modern physics, including relativity, atomic physics, quantum mechanics, condensed-matter physics, nuclear physics, and elementary particles. *Preq:* PHYS 222, MTHSC 206, or consent of instructor.

PHYS 401, H401 Senior Thesis (1-3) Semi-original theoretical, experimental, or computational research project performed under the direction of a faculty member. Fields available include astronomy, astrophysics, atmospheric physics, biophysics, high energy physics, relativity, solid state physics, and statistical mechanics. May be repeated for a maximum of six credits. *Preq:* Nine credits of physics at the 300/400 level.

PHYS 417, H417, 617 Introduction to Biophysics I 3(3,0) Introduction to the application of physics to biological problems. Topics include a review of elementary chemical and biological principles, physics of biological molecules, and fundamentals of radiation biophysics. *Preq:* MTHSC 206, PHYS 221, or consent of instructor.

PHYS 420, 620 Atmospheric Physics 3(3,0) Study of physical processes governing atmospheric phenomena. Topics include thermodynamics of dry and moist air, solar and terrestrial radiative processes, convection and cloud physics, precipitation processes, hydrodynamic equations of motion and large-scale motion of the atmosphere, numerical weather prediction, atmospheric electricity. *Preq:* MTHSC 108, PHYS 208 or 221.

PHYS 432, H432, 632 Optics 3(3,0) Covers a selection of topics, depending on the interest of the student. Topics may include the formation of images by lenses and mirrors, design of optical instruments, electromagnetic wave propagation, interference, diffraction, optical activity, lasers, and holography. *Preq:* PHYS 221.

PHYS 441, H441, 641 Electromagnetics I 3(3,0) Study of the foundations of electromagnetic theory. Topics include electric fields, electric potential, dielectrics, electric circuits, solution of electrostatic boundary-value problems, magnetic fields, and magnetostatics. *Preq:* PHYS 221 and MTHSC 208, or consent of instructor.

PHYS 442, H442, 642 Electromagnetics II 3(3,0) Continuation of PHYS 441. Study of foundations of electromagnetic theory. Topics include magnetic properties of matter, microscopic theory of magnetization, electromagnetic induction, magnetic energy, AC circuits, Maxwell's equations, and propagation of electromagnetic waves. Other topics may include waves in bounded media, antennas, electrodynamics, special theory of relativity, and plasma physics. *Preq:* PHYS 441 or consent of instructor.

PHYS 446, H446, 646 Solid State Physics 3(3,0) Introductory treatment of the crystal structure of solids and the properties of solids which depend on crystal structure, free electron model of metals, band theory of solids, Brillouin zones, crystalline defects, and diffusion. *Preq:* PHYS 222 or consent of instructor.

PHYS 452, H452, 652 Nuclear and Particle Physics 3(3,0) Study of our present knowledge concerning subatomic matter. Experimental results are stressed. Topics include particle spectra, detection techniques, Regge pole analysis, quark models, proton structure, nuclear structure, scattering and reactions.

PHYS 455, H455, 655 Quantum Physics I 3(3,0) Discussion of solution of the Schrodinger equation for free particles, the hydrogen atom, and the harmonic oscillator. *Preq:* PHYS 322 and 441, or consent of instructor.

PHYS 456, H456, 656 Quantum Physics II 3(3,0) Continuation of PHYS 455. Application of principles of quantum mechanics as developed in PHYS 455 to atomic, molecular, solid state, and nuclear systems. *Preq:* PHYS 455.

PHYS 465, H465, 665 Thermodynamics and Statistical Mechanics 3(3,0) Study of temperature development of the laws of thermodynamics and their application to thermodynamic systems. Introduction to low temperature physics is given. *Preq:* Six hours of physics beyond PHYS 222 or consent of instructor.

PHYS 475 Selected Topics 1-3(0-3,0-9) Comprehensive study of a topic of current interest in the field of physics. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

PLANT PATHOLOGY

Professors: N. D. Camper, B. A. Fortnum, S. A. Lewis, S. B. Martin, J. D. Mueller, R. B. Riley, S. W. Scott; *Associate Professors:* S. N. Jeffers, A. P. Keinath; *Assistant Professor:* G. Schnabel

PL PA 302, H302 Plant Pathology Research 1-3(0,3-9) Research experience in a plant pathology project for undergraduates who understand basic concepts of research. Students develop research objectives, procedures, and collect data. A written report includes interpretation of results. To be taken Pass/Fail only. *Preq:* Consent of instructor.

PL PA 310 Plant Diseases and People 3(2,3) Introduction to diseases caused by biotic and abiotic agents, symptom development, diagnosis, economics, control, and relationship of plant diseases to human welfare including the uses of genetic engineering to develop disease resistant crops. *Preq:* BIOL 104 or equivalent.

PL PA (ENT) 406, H406, 606 Diseases and Insects of Turfgrasses 3(2,2) Host-parasite relationships, symptomatology, diagnosis, economics, and control of infectious and noninfectious diseases of turfgrasses; life histories, diagnosis, and control of important insect pests of turfgrasses. *Preq:* ENT 301 and PL PA 310 or equivalent.

PL PA 411, 611 Plant Disease Diagnosis I 2(1,2) Methods and procedures used in the diagnosis of plant diseases, especially late spring and early summer diseases. Basic techniques of pure culture and identification of plant pathogens and Koch's postulates are taught. Diagnosis of a wide variety of diseases of cultivated and wild plants is carried out. *Preq:* PL PA 310 or equivalent.

PLANT PHYSIOLOGY

PL PH (BIOEC) 340 Plant Medicine and Magic 3(3,0) Study of use of compounds of plant and fungal origin as poisons, hallucinogens, and pharmaceuticals. *Preq:* BIOL 104, CH 102, or consent of instructor.

POLITICAL SCIENCE

Professors: W. Lasser, *Interim Chair:* M. A. Morris, B. W. Ransom, S. H. Wainwright, J. D. Woodard; *Associate Professors:* X. Hu, L. R. Olson; *Assistant Professors:* M. D. Crosston, R. W. Smith, A. L. Warber; *Visiting Instructors:* J. A. Hetherington, V. Matic, J. R. Willard-Dillard

PO SC 101, H101 American National Government 3(3,0) Introduction to American national government and politics examining topics such as the Constitution, federalism, political institutions, political behavior, and political participation.

PO SC 102, H102 Introduction to International Relations 3(3,0) Overview of both theory and practice in contemporary global politics. Topics include the structure of and primary actors in the international system; reasons conflict occurs; and roles of international institutions, law, and policy.

PO SC 104, H104 Introduction to Comparative Politics 3(3,0) Introduction to the study of comparative politics in the post-Cold War era, with emphasis on theories and applications. Topics include democratic and nondemocratic systems; ideology; political culture; party systems; and legislative, executive, and judicial structures.

PO SC 301 Foundations of Political Science 3(3,0) Introduction to the study of political science, including an examination of key concepts in the discipline, methods and approaches to research in the various subfields, and skills and techniques of importance to the political science student. *Preq:* Restricted to Political Science majors.

PO SC 302 State and Local Government 3(3,0) Introduction to American state and local governments, including examination of nature and scope of non-national governments and their interaction with the U.S. federal system. Emphasis is on structural features, functions, and policies of non-national governments.

PO SC 310 Political Science Internship 1-3(1-3,0) Off-campus internship for at least one semester or its equivalent. May be repeated for a maximum of three credits. No more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree. *Preq:* PO SC 101 and consent of instructor.

PO SC 311 Model United Nations 1(0,1) Participation in United Nations simulation exercises, in competition with other colleges and universities. May be repeated for a maximum of six credits; however, no more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree. *Preq:* Consent of instructor.

PO SC 312 State Student Legislature 1(0,1) Participation in state student legislature simulation exercises, in competition with other colleges and universities in the State. May be repeated for a maximum of six credits; however, no more than six hours credit from PO SC 310, 311, and 312 may be counted toward any degree. *Preq:* Consent of instructor.

PO SC 321 Public Administration 3(3,0) Introduction to public administration including the elements of organization, personnel and financial management, administrative law, and administrative responsibility. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 341 Quantitative Methods in Political Science 3(3,1) Introduction to quantitative research methods in political science. Topics include research design, measurement, data collection, sampling, procedures, and applications of statistical techniques to research problems in political science. Laboratory stresses computer use for elementary data analysis.

PO SC 343 The Mass Media in American Politics 3(3,0) Role and impact of the mass media in the American political system, with emphasis on the media's role in shaping public opinion and in influencing government and public policy. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC (LANG) 350 Seminar in International News 3(3,0) See LANG 350.

PO SC (E L E, PSYCH, SOC) 356 Social Science of Entrepreneurship 3(3,0) See SOC 356.

PO SC 361, H361 International Politics in Crisis 3(3,0) Factors contributing to the prevalence of tension and violence in the contemporary global arena are identified and analyzed, with particular emphasis on political, economic, and military roots and manifestations of conflict. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 362 International Organizations 3(3,0) Examines normative and institutional foundations of the society of nations. Explains the formal institutions, decision making processes, and multilateral capacities of international governmental and nongovernmental organizations. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 363 United States Foreign Policy 3(3,0) American foreign policy in historical perspective, with particular emphasis on the decision making process, contemporary American capabilities and challenges, and analysis of key issues. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 367 Political Risk Assessment 3(3,0) Risks associated with conducting business and other activities in different countries, especially in the frequently unstable setting of the developing world. Major commercial providers of country risk assessment are identified and critiqued. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 371 European Politics 3(3,0) Major emphasis on European governments and issues of importance in the European context. Current methods of comparison are studied and applied to the formal and informal functioning of European governments. *Preq:* PO SC 102, Junior standing, or consent of instructor.

PO SC 372 Political Culture of East Asia 3(3,0) Introduction to political culture that commonly characterizes East Asian countries, with emphasis on political subcultures of different nations, and on the analysis of the mutual influence between politics and culture. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 375, H375 European Integration 3(3,0) Survey course analyzing increasing institutional cooperation between European countries with a focus on the European community. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 381 African American Politics 3(3,0) Examination of African American political thought, interests and agenda setting, and dynamics of African Americans' participation in political and governmental decision making. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC (SPAN) 382 Spanish Foreign Language News 1(1,0) Weekly discussions of Spanish-language news articles in the foreign press with an emphasis on politics and on the connections among political, economic, social, and cultural trends. Emphasis on Spanish vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* SPAN 202 or equivalent or consent of instructor.

PO SC (FR) 383 French Foreign Language News 1(1,0) Weekly discussions of French-language news articles in the foreign press with an emphasis on politics and the connections among political, social, economic, and cultural trends. Emphasis on French vocabulary as well as cross-cultural contrasts with the United States. May be repeated for a maximum of three credits. *Preq:* FR 202 or equivalent or consent of instructor.

PO SC 389 Selected Topics 1-3(1-3,0) Examination of a selected area of political science. May be repeated for a maximum of six credits, but only if different topics are covered. *Preq:* Consent of instructor.

PO SC H395 Junior Honors Research Seminar 1(1,0) Readings and discussion to prepare for the Junior Research Paper and the Senior Thesis. *Preq:* Junior standing, membership in Calhoun Honors College, consent of instructor.

PO SC H396 Junior Honors Research 1(1,0) Readings and research in conjunction with an approved political science course at the 300 or 400 level. *Preq:* Junior standing, membership in Calhoun Honors College, and consent of instructor.

PO SC 403 United States Congress 3(3,0) Examination of the evolution of Congress, congressional elections, the organization of the legislative branch, congressional rules and procedures, decision making, styles of representation, and policymaking. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 405 The American Presidency 3(3,0) Examination of the evolution of the presidency, the powers of the chief executive, the public presidency, executive branch organization and staffing, decision making, and the implementation of public policy. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 407 Religion and American Politics 3(3,0) Examination of the impact of religion on American politics, including an analysis of the role of religion in politics, political behavior of major religious groups, constitutional issues and voting behavior. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 409, 609 Directed Study in American Politics 1-3(1-3,0) Supervised reading and/or research in selected areas of American government. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

PO SC 410 Directed Study in International Politics 1-3(1-3,0) Supervised readings and/or research in selected areas of international and comparative politics. *Preq:* Consent of instructor.

PO SC 416, 616 Interest Groups and Social Movements 3(3,0) Empirical and normative examination of the origins, roles, and influence of interest groups and social movements in the United States and of the relationships among interest groups, social movements, and democratic theory. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 421, 621 Public Policy 3(3,0) Introduction to the major approaches to public policy making in American government. Topics include theories and models of policy making, the identification of policy problems, agenda setting, the formulation and adoption of policy, implementation, and program evaluation. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 423, 623 Urban Politics 3(3,0) Examines the nature and scope of politics in urban communities and offers an analysis of urban governance, especially in the interaction of public authority and private institutions in metropolitan areas. Emphasis is on the structure, processes, and problems challenging governments in urban America. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 424, 624 Federalism and Intergovernmental Relations 3(3,0) Introduction to the historical, theoretical, legal, and fiscal aspects of constitutionally divided government. Federal, state, and local division of responsibility for public services is emphasized along with the emerging devolution of those responsibilities from the federal government to states and localities. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 427, 627 Public Management 3(3,0) Examination of emerging management problems and issues facing federal, state, and local government and the application of management principles, practices, and techniques of public administration. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 428, 628 National Security Policy 3(3,0) National security threats and policy decision making. Issues covered include weapons of mass destruction, terrorism, organized crime, narcotics, arms control, intelligence, and homeland security. Students deliberate and assess threat priorities and crisis management. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 429, 629 Global Security Threats 3(3,0) Analysis, assessment, and management of the principal threats facing global security today. Topics include rogue nations, regional superpowers, alliances, organized crime, illegal weapons proliferation, and corruption. Emphasis is on the strategies available to the international community for dealing with these threats. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 430 Public Policy Evaluation 3(3,0) Discussion of the role of policy analysis in government. Applications of analytical and computer tools to substantive policy areas such as transportation, economic/community development, education,

poverty, and health. Students focus on assessing a policy from a set of options based on analytic criteria as well as developing policy alternatives. *Preq:* MTHSC 301 or PO SC 341 or equivalent.

PO SC 432, 632 American Constitutional Law: Structures of Government 3(3,0) Examination and analysis of Supreme Court decisions and other legal materials in the areas of national power, federalism, the separation of powers, and the role of the judiciary. *Preq:* Junior standing or consent of instructor.

PO SC 433, 633 American Constitutional Law: Rights and Liberties 3(3,0) Examination and analysis of Supreme Court decisions and other legal materials in the areas of civil rights and civil liberties, with an emphasis on freedom of speech, freedom of religion, equal protection of the laws, and privacy rights. *Preq:* Junior standing or consent of instructor.

PO SC 442, 642 Political Parties and Elections 3(3,0) Study of the distinctive features of the American two-party system with emphasis on presidential elections. Parties are examined as formal organizations, coalitions of voters and interest groups, coordinators of nomination and election processes, and managers of policy-making institutions. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 450 Political Theory 3(3,0) Moral concepts central to political life, including equality, freedom, community, and individualism. Emphasis is placed on the ideologies that express these concepts, including democracy, liberalism, conservatism, socialism, and Fascism. Philosophers covered range from Plato to Foucault. *Preq:* PO SC 101 or 102 or 104, Junior standing, or consent of instructor.

PO SC 453 American Political Thought 3(3,0) American political philosophy from the 17th century to the present with emphasis on political and social developments since the 1770s. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 454, 654 Southern Politics 3(3,0) Examination of the unique political environment of the American South, with emphasis on the events and social forces which have shaped politics in the region since World War II. Course material is approached from a variety of perspectives, including history, literature, social themes, and political culture. *Preq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 456 International Diplomacy and Conflict Resolution 3(3,0) Examination of war, organized violence, and the conditions needed for peace. Critical analysis of theoretical approaches to the causes and prevention of war. Emphasis is on peace making, multinational cooperation, and international negotiation. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 457, 657 Political Terrorism 3(3,0) Examination and analysis of the international phenomenon of terrorism in terms of origins, operations, philosophy, and objectives. *Preq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 458, 658 Political Leadership 3(3,0) Comparative examination of political leaders, focusing particularly on types, methods, and consequences of leadership and on the relationship between leaders and followers. *Prq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 459 Ethnic Violence 3(3,0) Examination of both theories and case studies of ethnic violence in today's world, with emphasis on understanding potential strategies of conflict resolution. *Prq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 466 African Politics 3(3,0) Comprehensive survey of major regional blocks as well as analysis of individual states and thematic concepts. *Prq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 471 Russian Politics 3(3,0) Comprehensive examination of the Russian Federation since the fall of the Soviet Union. The successes and failures of democratic transition are analyzed, with topics covering political participation, organized crime and corruption, center-periphery conflict, and ethnic/religious unrest. *Prq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 472 Japanese Politics 3(3,0) Concepts and operation of contemporary Japan's political system. Emphasis is on institution building and political economy after World War II. *Prq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 473 Eurasian Politics 3(3,0) Examination of the areas of the Caucasus and Central Asia, covering themes including democratization, globalization, terrorism, and stability. *Prq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 476 Middle East Politics 3(3,0) Comprehensive thematic and empirical analysis of the Middle East region. Issues covered include democratization, political and religious freedom, oil, the role of women, and terrorism. States analyzed include Syria, Jordan, Iran, Iraq, Saudi Arabia, Turkey, and the Gulf States. *Prq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 477 Chinese Politics 3(3,0) Concepts and operation of contemporary China's political system; emphasizes institutional innovation and political economy in recent reforms. *Prq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 478 Latin American Politics 3(3,0) Survey of prominent trends in Latin American politics, with a focus on major countries in the region and major issues affecting the region. Relations between Latin America and the United States and other prominent countries are also considered. *Prq:* PO SC 102 or 104, Junior standing, or consent of instructor.

PO SC 480, 680 Gender and Politics 3(3,0) Examination of the role of gender in politics in the United States and in other countries. Particular emphasis on the role of women in electoral politics, the impact of nationalist violence, and development policies on women's lives, and on women's rights as human rights. *Prq:* PO SC 101, 102, or 104, Junior standing, or consent of instructor.

PO SC 482 The Political Novel and Film 3(3,0) Examination of political novels and films. Emphasizes the development of these media as art forms; the relationship between political novels and films and politics at large; and the role of these media in shaping public opinion. *Prq:* PO SC 101, Junior standing, or consent of instructor.

PO SC 485, 685 Global Affairs and Governments 3(3,0) Designed for teachers and education students who wish to learn how to incorporate global affairs more fully into high school curricula. Overview of major topics involving foreign policies and world politics is provided.

PO SC 489, 689 Selected Topics 1-1(3-3,0) Intensive examination of a selected area of political science. May be repeated for a maximum of six credits, but only if different topics are covered. *Prq:* Consent of instructor.

PO SC H490 Senior Honors Thesis Research 3(3,0) Reading and research related to the senior honors thesis. *Prq:* Senior standing, membership in Calhoun Honors College, and consent of instructor.

PO SC H491 Senior Honors Thesis 3(3,0) Research and writing of the senior honors thesis. *Prq:* Senior standing, membership in Calhoun Honors College, and consent of instructor.

POLYMER AND TEXTILE CHEMISTRY

Professors: J. R. Asplund, S. B. Bhaduri, D. A. Brosnan, M. J. Drews, M. S. Ellison, *Director*; B. C. Goswami, C. W. Jarvis, B. I. Lee, H. J. Rack, C. D. Rogers, E. A. Vaughn; *Associate Professors:* J. M. Ballato, S. H. Foulger, G. C. Lickfield, E. C. Skaar, T. D. Taylor; *Assistant Professors:* P. Brown, J. Luo, I. A. Luzinov

PTC 303 Textile Chemistry 3(3,0) Study of the properties and reactions of aliphatic and aromatic organic compounds. Emphasis is placed on mechanistic interpretations and the development of synthetic schemes leading to polyfunctional compounds of the types encountered in the textile industry. *Prq:* CH 102. *Coreq:* MTHSC 206 or 207.

PTC 304 Textile Chemistry 3(3,0) Fundamental principles of physical chemistry with emphasis on areas frequently encountered in the textile industry including thermodynamics, kinetics, and solution properties. These concepts are applied to the study of organic compounds and organic reaction mechanisms. *Prq:* PTC 303.

PTC 305 Textile Chemistry Laboratory 1(0,3) Introduction to techniques used in synthesis and characterization of organic compounds. *Coreq:* PTC 303.

PTC 306 Textile Chemistry Laboratory 1(0,3) Techniques used in the measurement of the physicochemical properties of polymers and textile chemicals. *Coreq:* PTC 304.

PTC 405 Principles of Textile Printing 3(2,3) Development of modern textile printing systems is studied. In addition, colloidal requirements of colorants, thickener compositions, rheology of printing pastes, and various physical requirements necessary for a successful printing system in a modern plant are examined. *Prq:* Consent of instructor.

PTC 406 Textile Finishing—Theory and Practice 3(2,3) Study of the application of chemicals to textile substrates and how they affect the substrate's physical and chemical properties. Emphasizes the theories of chemical modification of textiles as well as the technology of finishing.

PTC 415, H415, 615 Introduction to Polymer Science and Engineering 3(3,0) Chemistry of monomers and polymers and the chemical and physical properties of polymers are discussed emphasizing fiber forming, synthetic polymers. Includes molecular characterization, structure, morphology, and mechanical properties as they relate to the design of polymer systems for end uses in textiles, geotextiles, plastics and fiber-reinforced composite materials. *Prq:* CH 201 and 330 or 224, PTC 304, or consent of instructor.

PTC 416, 616 Chemical Preparation of Textiles 3(2,3) Chemicals used in the preparation of fabric for dyeing and finishing. Oxidizing and reducing agents and their control and effect on various fibers. Colloidal and surface active properties of various compounds and the fundamental factors influencing these properties.

PTC 417 Polymer and Fiber Laboratory 1(0,3) High molecular weight polymers are prepared from monomers, and their chemical and physical properties are measured as functions of critical end use parameters using instrumental and physical methods. *Coreq:* PTC 415.

PTC 457, H457, 657 Dyeing and Finishing I 3(3,0) Understanding of physical, chemical, and mechanical principles behind the application of colors and finishes to textiles. Requires an appreciation of fiber chemistry and morphology, dye and finish structures and reactivity and mechanical principles behind equipment used to effect transfer of these chemicals onto the textile substrate.

PTC 458, H458, 658 Dyeing and Finishing II 3(3,0) Kinetics and equilibria of dyeing processes. The use of conductivity, diffusion, and other methods useful for measuring absorption of isotherms and dyeing rates and the general thermodynamic relationships applicable to dyeing operations. Fiber properties such as zeta potential, dye sites, relative amorphous area available are included.

PTC 459 Dyeing and Finishing Laboratory I 1(0,3) Introduces students to common dyeing and printing methods and to some of the machinery necessary to carry out dyeing operations. *Coreq:* PTC 457.

PTC 460 Dyeing and Finishing Laboratory II 1(0,3) Covers finishing in addition to dyeing operations and their instrumental control. *Coreq:* PTC 458.

PORTUGUESE

PORT 101 Elementary Portuguese 4(3,1) Introductory course stressing speaking, listening, and writing. Attention is given to the sound system of Portuguese to develop basic communication skills.

PORT 102 Elementary Portuguese 4(3,1) Continuation of PORT 101. *Prq:* PORT 101 or consent of instructor.

- PORT 201 Intermediate Portuguese 3(3,0)** Intermediate course with more emphasis on communication skills and structure. Reading and writing practice in and outside the classroom, with special attention to idiomatic usage. Introduction to perspectives through readings and cultural activities. *Preq:* PORT 102 or consent of instructor.
- PORT 202 Intermediate Portuguese 3(3,0)** Continuation of PORT 201. *Preq:* PORT 201 or consent of instructor.

PSYCHOLOGY

Professors: T. R. Alley, R. L. Campbell II, P. A. Connor-Greene, R. M. Kowalski, J. A. McCubbin, Chair; D. D. Moore, J. W. Murdoch, F. S. Switzer III, M. A. Taylor; *Associate Professors:* E. G. Brainerd, Jr., E. R. Muth, C. C. Pagano, J. J. Pilcher, C. L. S. Pury, P. Raymark, B. R. Stephens, R. A. Tyrell; *Assistant Professors:* T. R. Britt, L. Gugerty, M. Horvath; *Lecturer:* P. R. Alley

- PSYCH 201, H201 Introduction to Psychology 3(3,0)** Introduction to the study of behavior. Analysis of the biological bases of behavior, learning, thinking, motivation, perception, human development, social behavior, and the application of basic principles to more complex phenomena such as education, personal adjustment, and interpersonal relations.
- PSYCH 202 Introductory Psychology Laboratory 1(0,2)** Major phenomena and methods of psychology are illustrated and investigated in a series of laboratory modules. Students also explore career and academic development issues.
- PSYCH 306 Human Sexual Behavior 3(3,0)** The subject of sexual behavior is approached from the psychophysiological, behavioral, and cultural points of view. Evolutionary, historical, and cross-cultural perspectives are considered.
- PSYCH 308 Women and Psychology 3(3,0)** Explores the wide variety of psychological issues that concern women. Empirical research on topics such as motherhood, sex differentiation, motivation, and psychological disorders is emphasized. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 309 Introductory Experimental Psychology 4(3,2)** Introduction to the analysis of data from experimental and correlational research in psychology. Emphasis is placed on the applications and logical nature of statistical reasoning. Laboratory periods stress the techniques of data analysis using microcomputers. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 310 Advanced Experimental Psychology 4(3,2)** Continuation of PSYCH 309. Focus is on techniques of empirical research (experiments, quasi-experiments, survey research, etc.) that are widely used in psychology. Students design and carry out their own empirical research projects. Extensive practice in the writing of reports is included. *Preq:* PSYCH 201 with a C or better, PSYCH 309, or consent of instructor.
- PSYCH 320 Principles of Behavior 3(3,0)** Study of basic learning principles including classical conditioning, operant conditioning, and modeling. Initial emphasis is on animal studies followed by human applications and techniques. *Preq:* PSYCH 201 with a C or better or consent of instructor.

- PSYCH 324 Physiological Psychology 3(3,0)** Study of human neuroanatomy with emphasis on the function of the nervous and endocrine systems. Discusses the biological basis of behavior in its normal and abnormal dimensions. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 325 Physiological Psychology Laboratory 1(0,3)** Demonstrations and techniques of selected physiological procedures are presented to explain the principles discussed in PSYCH 324. *Coreq:* PSYCH 324.
- PSYCH 330 Motivation 3(3,0)** Various aspects of motivation are considered by studying physiological, emotional, and environmental influences on behavior. Orientation is empirical rather than theoretical with emphasis on pertinent research, applications, and measurement of motives. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 333 Cognitive Psychology 3(3,0)** Study of higher-order mental processing in humans. Topics include memory, learning of concepts, problem solving, and the psychology of language. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 334 Laboratory in Cognitive Psychology 1(0,2)** Selected experiments and demonstrations are conducted to reveal phenomena related to human perception, memory, reasoning, problem solving, and high-level mental processes. *Preq:* PSYCH 201 with a C or better and PSYCH 309, or consent of instructor. *Coreq:* PSYCH 333.
- PSYCH 340, H340 Lifespan Developmental Psychology 3(3,0)** Survey of current theory and research concerned with the psychological aspects of human growth and development across the entire lifespan. Major topics include developmental methods, physical maturation, cognition, socialization, personality, psycholinguistics, intelligence, learning, behavior problems, and exceptionality. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 344 Psychology of Adolescence 3(3,0)** Study of the psychosocial processes of adolescence. Major emphasis is on personality development, growth of thinking, social and sexual maturation, and variations in adolescence. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 345 Adulthood and Aging 3(3,0)** Special consideration of the major psychological processes of aging as they relate to individual behavior and adaptation. Includes the influences of aging on the body, learning and psychomotor skills, thinking and intelligence, employment and productivity, personality, and psychopathology. Opportunity for contact with institutionalized and noninstitutionalized elderly persons is provided. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 352, H352 Social Psychology 3(3,0)** Survey course analyzing human social behavior from the perspective of the individual as a participant in social relationships. Major emphasis is on the study of such contemporary social processes as attitude formation and change, interpersonal relations, conformity, conflict resolution, aggression and violence, social communication, and group phenomena. *Preq:* PSYCH 201 with a C or better or consent of instructor.

- PSYCH 355 Environmental Psychology 3(3,0)** Consideration of the influences of the physical environment on human behavior. Topics include perception of and adaptation to the environment, effects of physical design on behavior, and individual reactions to environmental stressors. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH (E L E, P O S C, S O C) 356 Social Science of Entrepreneurship 3(3,0)** See SOC 356.
- PSYCH 364 Industrial Psychology 3(3,0)** Review perception of work from the pre-industrial revolution to the present. Comparative approaches to motivation, development, maintenance, and attraction of successful work behaviors are discussed. Topics include the organization's responsibilities to the community, implementing a disease- and accident-free workplace, and the effects of consumerism. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 368 Organizational Psychology 3(3,0)** Analysis of individual behavior for the purpose of investigating problems in organizations and increasing organization effectiveness. Topics include psychological factors affecting communication, decision making, conflict, leadership, work stress, power, and organizational change. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 369 Leadership in Organizational Settings 3(3,0)** Broad survey of theory and research on leadership in formal organizations. A detailed explanation and critical evaluation of major theories (including participative and charismatic leadership) are bridged with helpful remedies and prescriptions for effective leadership in organizations. *Preq:* PSYCH 201.
- PSYCH 370 Personality 3(3,0)** Historical and contemporary views of individual differences in behavior, affect, health, coping, and motivation. Topics such as personality development and structure, personality assessment, cross-cultural issues, and applications of personality psychology are covered. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH 375 Psychology of Substance Abuse 3(3,0)** Study of the psychological approaches to treatment of substance abuse. Topics include behavioral, social learning, and family-systems theories as applied to treating substance abuse. Emphasis is on empirical approaches to evaluating methods of treatment and matching clients to treatments. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH H385 The Social Construction of Madness 3(3,0)** Study of the construct of mental illness and the variety of ways in which psychosis has been explained, portrayed, and treated over time. Interdisciplinary approach to examining representations of "madness" that shape a culture's understanding of mental illness and its treatment, including popular culture, art, and literature. *Preq:* PSYCH 201 with a C or better or consent of instructor.
- PSYCH H390 Honors Seminar in Psychology 3(3,0)** Variable topic seminar for Honors students from all majors. Topics are announced prior to registration for each semester. May be repeated once for credit, but only if different topics are covered. *Preq:* PSYCH 201 with a C or better or consent of instructor.

PSYCH 415 Systems and Theories of Psychology 3(3,0) Study of the development of psychology particularly during the past 100 years. Emphasis is on giving students a better perspective of present-day psychology. Focus is on the various approaches taken by influential psychologists and the conflicts among these approaches. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 422, H422 Sensation and Perception 3(3,0) Study of psychophysical techniques of measurement and sensory and perceptual processes related to vision, hearing, and the other senses. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 423 Sensation and Perception Laboratory 1(0,2) Selected experiments are conducted to demonstrate the phenomena involved in sensation and perception. *Preq:* PSYCH 309 or consent of instructor.

PSYCH 426, 626 Advanced Physiological Psychology 3(3,0) Advanced studies of the biological basis of behavior with emphasis on functional neuroanatomy and endocrinology. Topics may vary. May not be repeated for credit. *Preq:* PSYCH 324 or consent of instructor.

PSYCH 435 Human Factors Psychology 3(3,0) Analyses of theoretical issues and research methods related to the interaction between people and machines and human performance. Topics include information processing theory, human control systems and displays, task simulation, perceptual and motor factors limiting human performance. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 443 Infant and Child Development 3(3,0) Cognitive, emotional, and social development from conception through childhood (up to age 12). Major theories and research findings are covered. *Preq:* PSYCH 201 with a C or better and PSYCH 340, or consent of instructor.

PSYCH 447 Moral Development 3(3,0) Explores the development of moral reasoning, judgment, and character from a descriptive psychological point of view. Examines the theoretical and empirical work of Jean Piaget, Lawrence Kohlberg, and Elliot Turiel as well as prosocial, eudaimonistic, and cross-cultural alternatives to these ideas. *Preq:* PSYCH 201 with a C or better; PSYCH 340, 344, or 345; or consent of instructor.

PSYCH 454 Psychology of Human Relationships 3(3,0) Research, theory, and their practical applications regarding the development, maintenance, and dissolution of human relationships; understanding successful and unsuccessful relationships. Emphasis is on improving the individual's ability to relate to other persons both interpersonally and professionally. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 459, 659 Group Dynamics 3(3,0) Review of current theory and research on small-group processes with special emphasis given to group formation and development, group structure, the dynamic forces within a group, leadership, and group problem solving and decision making. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 462, 662 Psychology and Culture 3(3,0) Seminar examining the cultural context in which psychological theories and research are generated and psychological perspectives on human diversity. Topics include the philosophical positions influencing psychological theory and research; methodological issues in the study of diversity, historical and contemporary perspectives; and cross-cultural psychological research in selected content areas. *Preq:* PSYCH 310 or consent of instructor.

PSYCH 471 Psychological Testing 3(3,0) Introduction to the theory of psychological testing, emphasizing the principles of measurement and psychometric characteristics of a good psychological test. Issues in test development, administration, and interpretation are reviewed. Educational, industrial, and clinical uses of tests are examined. *Preq:* PSYCH 201 and 309, or consent of instructor.

PSYCH 480, 680 Health Psychology 3(3,0) Study of the role of health-related behaviors in the prevention, development and/or exacerbation of health problems. Emphasis on the biopsychosocial model and its application in the assessment, treatment, and prevention of health problems. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 483, H483, 683 Abnormal Psychology 3(3,0) Introduction to the diagnosis and treatment of mental illnesses. Uses current diagnostic standards for mental disorders as a framework for understanding the symptoms, causes, and treatments of the most commonly observed maladaptive behaviors. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH 488 Theories of Psychotherapy 3(3,0) Survey of alternative theories of psychological treatment for behavioral and emotional disorders. Various theoretical assumptions, techniques, and applications of each approach are examined and compared, and case examples are considered. *Preq:* PSYCH 370 or 483 or consent of instructor.

PSYCH 489, 689 Selected Topics 3(3,0) Seminar in current topics in psychology. Topics change from semester to semester and are announced prior to each semester's registration. May be repeated once for credit, but only if different topics are covered. *Preq:* PSYCH 201 with a C or better and one 300-level psychology course, or consent of instructor.

PSYCH H490 Senior Division Honors Research 12-4(2-4,0) Preparation and defense of a research proposal. Proposed project should be empirical, historical, or theoretical in nature. *Preq:* Junior standing, consent of department chair.

PSYCH H491 Senior Division Honors Research II 2-4(2-4,0) Completion of the proposed research project resulting in a written thesis. *Preq:* PSYCH H490.

PSYCH 492 Senior Laboratory in Psychology 1(0,2) Students complete an integrative review of topics in psychology in the context of producing a reflective portfolio. *Preq:* Senior standing in Psychology.

PSYCH 493 Practicum in Clinical Psychology 3(1,5) Students apply classroom theory in solving individual and community problems through interaction with community agencies and other professional groups in the mental health area. Students have limited but well-controlled contact with actual clinical problems as they occur in the community environment. *Preq:* PSYCH 483 and consent of instructor.

PSYCH 495 Practicum in Applied Psychology 3(1,5) Students are provided practical experience in the area of applied psychology. Students usually are involved in a project designed to help solve an industrial problem through a direct application of industrial or social psychology. *Preq:* PSYCH 352 or 364 or 454; consent of instructor.

PSYCH 496 Laboratory in Psychology 1-3(0,2-6) Laboratory in a variety of topics in psychology such as human factors psychology and psychological testing. May be repeated for a maximum of three credits. *Preq:* PSYCH 201 with a C or better; PSYCH 309, 310; or consent of instructor.

PSYCH 497, H497 Directed Studies in Psychology 1-4(0,2-6) Study under the direction of a faculty member of a particular topic agreed upon by the student and faculty member. May be repeated for a maximum of 12 credits. *Preq:* Six credits in psychology, a course in research methods, and consent of the instructor.

READING

Professor: K. S. Headley; *Associate Professors:* P. J. Dunston, V. G. Ridgeway; *Assistant Professor:* L. F. Medford; *Lecturers:* J. M. Roper, N. S. Wilkinson

READ 101 Reading Strategies 2(3,0) Primary focus is on critical reading of textbook materials and persuasive materials. Students learn how to apply and generalize newly acquired strategies to a variety of reading materials.

READ 102 Critical Reading and Thinking 2(3,0) Students learn critical reading skills in interpretation, analysis, inference, oral communication, and debate. Includes characteristics of debate in addition to the steps and sources of research. These skills are applied to important political and social issues of contemporary public concern.

READ 103 Learning Strategies 2(3,0) Students learn strategies of active learning and critical thinking skills which become an integral part of their natural thinking processes. Students learn how to generalize and apply newly acquired strategies to a variety of settings and situations.

READ 458 Early Literacy: From Birth to Kindergarten 3(3,0) Provides early childhood, elementary, and special education majors with knowledge of theory and research-based, developmentally appropriate instructional practices related to children's literacy development within the home and school from birth to kindergarten. Factors related to assessment and communication within and between the family, school, and teacher are addressed. *Preq:* Admission to the professional level.

READ 459, H459 Teaching Reading in the Early Grades: K-3 3(3,0) [W.1] Provides early childhood and Elementary Education majors an understanding of teaching reading in the elementary school setting in kindergarten through third grade. Students investigate general principles of language and literacy development and learn methods for teaching and assessing children's literacy. *Preq:* ED EC 336, ED F 301, 302, admission to the professional level. *Coreq:* ED EC 400 for Early Childhood majors.

READ 460, H460 Teaching Reading in the Intermediate Grades: 4-8 3(3,0) Provides Elementary Education majors an understanding of teaching reading in the elementary school setting in grades four through eight. Students investigate general principles of language and literacy development and learn methods for teaching and assessing children's literacy. *Preq:* ED F 301, 302, 334. *Coreq:* ED EL 401 (Elementary Education majors), admission to the professional level.

READ 498, H498 Secondary Content Area Reading 3(2,2) Designed for pre-service teachers who are involved with field experiences prior to student teaching full time. Prepares content area teachers to teach the reading skills necessary for effective teaching of content area material. *Preq:* Admission to professional level.

RELIGION

Professors: S. E. Grosby, N. A. Hardesty

REL 101 Introduction to Religion 3(3,0) Variety of religious experience and expression in human life.

REL 102 World Religions 3(3,0) Survey of major religious traditions of the world.

REL 301 The Old Testament 3(3,0) Survey of the books of the Old Testament with special consideration given to the development of the concepts, institutions, and theology of the ancient Hebrews.

REL 302 Survey of New Testament Literature 3(3,0) Study of the books of the New Testament from the standpoint of their occasion, content, literary form, and basic theology.

REL 306 Judaism 3(3,0) Examines the development of Judaism from Biblical to modern times.

REL 307 The Christian Tradition 3(3,0) Examination of the development of Christianity in Western civilization from the post-New Testament period to the present, stressing institutional growth and changes, theological currents, and interaction of Christianity with culture.

REL 308 Religions of the Ancient World 3(3,0) Selected religious movements in ancient Mesopotamia, Egypt, Canaan, and the Greco-Roman world with emphasis on movements outside the Judeo-Christian tradition.

REL 310 Religion in the United States 3(3,0) Development of religion in the U.S. from the Colonial period to the 20th century. Attention is devoted to analyzing broad currents in religious movements and religious thought which have given shape to the American pluralistic experience.

REL 311 African American Religion 3(3,0) Study of the religious milieu in the U.S. rooted in our African heritage. Background on African tribal religion is included, along with Christian denominations and new religions such as Nation of Islam, Rastafarianism, Voudun, Santeria, and Candomble.

REL 314 Buddhism in China 3(3,0) Study of Buddhism in Chinese history since the second century. Examination of the translation and interpretation of the texts, major Chinese Buddhist schools, monastic life, and the comprehensive influence of Buddhism on Chinese culture and society. All readings and discussions are in English.

REL 330 Contemporary Issues in Religion 3(3,0) Examination of a variety of issues of broad concern to scholars of religion today. Issues may vary. May be repeated for a maximum of six credit hours with departmental consent.

REL (PHIL) 393 Science and Religion 3(3,0) Exploration and analysis of the conceptual and historical relationship between science and religion. Examination and evaluation of the theoretical claims of science and the metaphysical claims of religion.

REL 401 Studies in Biblical Literature and Religion 3(3,0) Critical examination of a selected topic in biblical studies. Topics vary from year to year. May be repeated once for credit. *Preq:* Consent of instructor.

REL 402, 602 Studies in Religion 3(3,0) Thorough examination of a selected topic in one or more of the religious traditions of the world or of religious life in a particular region. Topics vary from year to year. May be repeated once for credit. *Preq:* Consent of instructor.

REL 404, 604 History of Early Christianity 3(3,0) Study of the history, social and doctrinal, of early Christianity up to 600 A.D. *Preq:* Consent of instructor.

REL 435, 635 Religious Institutions in Community Life 3(3,0) Explores the particular significance of religious organizations as core institutions in American communities and examines their involvement with community political and social structures.

REL 499 Independent Study 1-3(1-3,0) Study of selected problems, issues, or movements in religion under the direction of a faculty member chosen by the student. Student and faculty member develop an individualized course of study approved by the department chair prior to registration. May be repeated for a maximum of six credits. *Preq:* Consent of instructor.

RURAL SOCIOLOGY

Professor: C. M. Sieverdes

R S 301 Rural Sociology 3(3,0) Study of human social relationships as influenced by life in the open country and in small towns and villages including considerations of the rural population, rural social institutions, processes of change in agricultural technology, and community area planning and development.

R S (SOC) 303 Methods of Social Research I 4(3,3) See SOC 303.

R S (SOC) 371 Population and Society 3(3,0) See SOC 371.

R S (SOC) 401, 601 Human Ecology 3(3,0) Analysis of the interrelationships between the physical world, modifications in natural environments, human settlement patterns, and institutions that both encourage and regulate environmental modification. Emphasis is placed on conditions whereby natural resources become public policy concerns. *Preq:* Sophomore standing.

R S (SOC) 459, 659 The Community 3(3,0) Close analysis of the development of contemporary communities and their place in society. Continuing effects of industrialization, migration, and technological change on community location and structure are examined. Structural relations of social class, status, and the associations among institutions are explored.

R S (SOC) 471, H471, 671 Demography 3(3,0) Demographic concepts, theory, and research methods for vital statistics, migration, and population distribution and projections. Collection and processing of demographic data and organization of demographic data systems. *Preq:* ANTH 201 or SOC 201 or R S 301.

R S (SOC) 495 Field Experience 3(1,8) See SOC 495.

R S (SOC) 498 Independent Study 3(1,6) See SOC 498.

RUSSIAN

Assistant Professor: G. L. Love; *Lecturer:* J. Bridgwood

RUSS 101 Elementary Russian 4(3,1) Training in pronunciation, grammatical forms, and syntax with a view to giving the student the fundamentals necessary to hold simple conversations and to read simple Russian texts.

RUSS 102 Elementary Russian 4(3,1) Continuation of RUSS 101. *Preq:* RUSS 101.

RUSS 201, H201 Intermediate Russian 3(3,1) Brief review of RUSS 101 and 102 with conversation, composition, and dictation, and the beginning of more serious reading of Russian prose in short stories and plays. *Preq:* RUSS 102.

RUSS 202, H202 Intermediate Russian 3(3,1) Conversation, composition, and dictation based on readings of more difficult Russian prose than in the earlier courses. *Preq:* RUSS 201.

RUSS 305 Russian Conversation and Composition 3(3,0) Practice in spoken Russian emphasizing vocabulary building, pronunciation, and comprehension. Written exercises promote accuracy. *Preq:* RUSS 202 or consent of department chair.

RUSS 307 Russian Civilization 3(3,0) Introduction to significant elements of Russian civilization. Emphasis is on social, geographical, political, and artistic aspects of modern Russia. Taught in Russian. *Preq:* RUSS 202 or consent of department chair.

RUSS 398 Directed Reading 1-3(1-3,0) Directed study of selected works in Russian. May be repeated for a total of six credits. *Preq:* RUSS 202 or equivalent and consent of department chair.

SECONDARY EDUCATION

EDSEC 412 Directed Student Teaching in Secondary School Subjects 12(1,33) Program of supervised observation and teaching in cooperation with selected public schools. Opportunities are provided for prospective teachers to obtain experiences in the subject area. Students are sectioned according to teaching fields: English, history, social science, mathematical sciences, modern languages, science. Enrollment is limited.

EDSEC 417 Teaching Internship in the Secondary School 6(1,15) Full-time, supervised teaching internship for one semester in cooperation with a participating South Carolina secondary school. Reserved for students seeking certification in critical-need teaching areas. May be repeated for a maximum of 12 credits. To be taken Pass/Fail only. *Prq:* ED F 301, 302, 335, READ 498, and one of the following: EDSEC 424, 425, 426, 427. Application approved by the School of Education.

EDSEC 424, H424 Teaching Secondary English 3(2,2F) Development of instructional practices and materials appropriate for secondary English; familiarization with curriculum materials; includes field experiences in local schools in preparation for student teaching. *Prq:* Second semester Junior standing, admission to the professional level, ED 105, ED F 301, 302, 335, at least 18 hours of English coursework, concurrent enrollment in READ 498, minimum grade-point ratio of 2.5.

EDSEC 425 Teaching Secondary Modern Languages 3(2,2F) Development of instructional practices and materials appropriate for secondary modern languages; familiarization with curriculum materials; includes field experiences in local schools. *Prq:* Second semester Junior standing, admission to the professional level, ED 105, ED F 301, 302, 335, 18 hours of modern language coursework, concurrent enrollment in READ 498, minimum grade-point ratio of 2.5.

EDSEC 426, H426 Teaching Secondary Mathematics 3(2,2F) Development of instructional practices appropriate for secondary mathematics; familiarization with curriculum materials, planning, and implementation of lessons; includes field experiences in local schools. *Prq:* Admission to the professional level, ED 105, ED F 301, 302, 335, at least 18 hours of mathematics coursework, concurrent enrollment in READ 498, minimum grade-point ratio of 2.5.

EDSEC 427, H427 Teaching Secondary Science 3(2,2F) Development of instructional practices and materials for teaching secondary school science (biological, earth, and physical sciences); familiarization with secondary science curriculum materials; includes field experiences in local schools. *Prq:* Second semester Junior standing, admission to the professional level, ED 105, ED F 301, 302, 335, at least 18 hours of science coursework, concurrent enrollment in READ 498, minimum grade-point ratio of 2.5.

EDSEC 428, H428 Teaching Secondary Social Studies 3(2,2) Development of instructional practices and materials appropriate for secondary social studies; familiarization with curriculum materials; includes field experiences in local schools in preparation for student teaching. *Prq:* Second semester

Junior standing, admission to the professional level, ED 105, ED F 301, 302, 335, at least 18 credits of social studies coursework, passing score on South Carolina social studies content knowledge exam, concurrent enrollment in READ 498.

EDSEC 437, 637 Technology in Secondary Mathematics 3(3,0) Students learn how to integrate calculators, data collectors, and computers in the secondary mathematics curriculum. They solve problems from middle school, Algebra I, Geometry, and Algebra II courses. *Prq:* Second semester Junior standing, admission to the professional level.

EDSEC 444 Teaching Internship in Secondary English 9(0,27)S Interns design, implement, and critically reflect upon instructional units and teaching practices in supervised secondary English classes. Interns must provide evidence of performance that meets national and state teaching standards for secondary English. *Prq:* EDSEC 424. *Coreq:* EDSEC 454.

EDSEC 446 Teaching Internship in Secondary Mathematics 9(0,27)S Prospective secondary mathematics teachers apply teaching and learning theories in a field-based setting through an internship in a secondary public school classroom. *Prq:* EDSEC 426. *Coreq:* EDSEC 456.

EDSEC 447 Teaching Internship in Secondary Science 9(0,27)S Supervised teaching internship in an assigned secondary public school science classroom. Meets part of requirement for South Carolina science teaching certification. *Prq:* EDSEC 427. *Coreq:* EDSEC 457.

EDSEC 448 Teaching Internship in Secondary Social Studies 9(0,27) Supervised observation and teaching in cooperation with a mentor teacher in a secondary public school. Students design, implement, and critically reflect upon curricular and instructional practices in public secondary social studies classrooms. *Prq:* EDSEC 428. *Coreq:* EDSEC 458.

EDSEC 454 Secondary English Capstone Seminar 3(2,3)S Seminar in conjunction with EDSEC 444. Interns reflect upon and solve problems regarding teaching events, share effective teaching practices, and devise ways to document dimensions of effective teaching. *Prq:* EDSEC 424. *Coreq:* EDSEC 444.

EDSEC 456 Secondary Mathematics Capstone Seminar 3(2,3)S Capstone seminar accompanying supervised secondary mathematics teaching internship. Satisfies part of the requirements for South Carolina secondary certification. *Prq:* EDSEC 426. *Coreq:* EDSEC 446.

EDSEC 457 Secondary Science Capstone Seminar 3(2,3)S Capstone seminar accompanying supervised high school science teaching internship. Satisfies part of requirement for South Carolina secondary science certification. *Prq:* EDSEC 427. *Coreq:* EDSEC 447.

EDSEC 458 Secondary Social Studies Capstone Seminar 3(2,3)S Capstone seminar accompanying supervised high school social studies teaching internship. Satisfies part of requirement for South Carolina secondary certification. *Prq:* EDSEC 428. *Coreq:* EDSEC 448.

SOCIOLOGY

Professors: J. M. Coggeshall, D. K. Sturkie, *Chair*; B. J. Vandler Mey, D. A. Ward, W. M. Wentworth; *Associate Professors:* J. E. Hawdon, F. C. Mobley, I. G. Peppers, J. C. Witte; *Assistant Professors:* E. M. Granberg, B. A. Rothenberg.

SOC 201, H201 Introduction to Sociology 3(3,0) Sociological perspective: the study of contemporary groups, organizations, and societies in terms of human social behavior, social change, social structure, and social institutions.

SOC 202 Social Problems 3(3,0) Social problems involving the family, education, health care, political and legal systems, economy, population, environment, community; and special problems associated with age, economics, racial status, and gender inequality.

SOC (C R D) 235 Introduction to Leadership 3(3,0) Introduction to leadership in various organizational settings from a sociological perspective. Examines the concept of leadership, leadership traits, types of leadership, and the evolution of leadership behaviors in the 19th and 20th centuries.

SOC (R S) 303, H303 Methods of Social Research 14(3,3) Introduction to methods of social research: research design, sampling, measurement, reliability, and validity; the relationship between theory and research. Coordinating laboratory introduces students to computer literacy through research. Required of all Sociology majors. *Prq:* CPSC 120, MTHSC 203 or 301 or EX ST 301, SOC 201.

SOC 310, H310 Marriage and Intimacy 3(3,0) Examination of mate selection, living together, marital relations, family planning, conflict resolution, divorce and remarriage, later life adjustments, and singlehood as a lifestyle in the United States. *Prq:* SOC 201 or consent of instructor.

SOC 311 The Family 3(3,0) Introduction to the family as a social institution. Primary focus is on families in the U.S. with comparisons to other cultures. Topics include history of the family, trends in family formation and dissolution, division of labor, intergenerational relationships, family violence, and policy. Analyses of race, class, and gender are incorporated. *Prq:* SOC 201 or consent of instructor.

SOC 330 Work and Careers in Society 3(3,0) Introduces changes in the structure of work from pre-industrial to postindustrial periods. Topics include the effects of stratification on career decisions, career paths and implications for life changes, social effects of scientific management of work, unionization, globalization, the rise of multinational corporations, and cross-cultural comparisons of management styles. *Prq:* SOC 201 or consent of instructor.

SOC 331 Urban Sociology 3(3,0) Urbanization as a social process and related conditions of work, family structure, social mobility, crime, lifestyle, technology, and development of urban areas in the Third World. *Prq:* SOC 201.

SOC 350 Self and Society 3(3,0) Social psychology from the sociological viewpoint. Examination of the interactional and group influences on such individual conditions as childhood and life-course development, language, emotions, motives, sexuality, deviance, and self-concept. *Prq:* SOC 201.

SOC 351 Collective Behavior 3(3,0) Spontaneous, transitory, and sporadic group behavior: crowds, panics, riots, fads, and social movements. *Preq:* SOC 101.

SOC (E L E, PO SC, PSYCH) 356 Social Science of Entrepreneurship 3(3,0) Examines those areas of the social sciences that have direct relevance for entrepreneurs. Topics include processes by which entrepreneurs are shaped by social institutions such as the family and community, public policy implications and influences on entrepreneurship, risk perception, decision making, motivation, leadership, and group dynamics. *Preq:* SOC 201 or (C R D) 235 or PSYCH 201 or PO SC 101 or 102 or 104 or consent of instructor.

SOC (R S) 371 Population and Society 3(3,0) Social, economic, and political consequences of population structure and change, including problems of food and resources, as well as population goals and policies in developing countries and the United States. *Preq:* SOC 201.

SOC 380 Introduction to Social Services 3(3,0) Fundamentals of casework practice, including philosophy and values, models of group work, and ethics in social services work. *Preq:* SOC 201.

SOC 390 The Criminal Justice System 3(3,0) Social systems analysis of criminal justice agencies; primary focus on law enforcement and corrections and their interagency relationship with courts and prosecution. *Preq:* SOC 201.

SOC 391 Sociology of Deviance 3(3,0) Patterns of deviant behavior; subcultures, careers, and life-styles of deviants; deviance theory and research. *Preq:* SOC 201.

SOC 392 Juvenile Delinquency 3(3,0) Nature, extent, and causes of juvenile delinquency; societal attempts to control delinquent conduct and gang violence; emergence of the juvenile justice system. *Preq:* SOC 201.

SOC 393 Criminology 3(3,0) Nature and causes of criminal behavior; societal attempts to control crime; social responses to crime, criminals, and the criminal justice system. *Preq:* SOC 201.

SOC 394, H394 Sociology of Mental Illness 3(3,0) Mental illness as a social phenomenon, including cultural and social influence, organizational settings of mental health-care delivery, legal issues, patient-therapist relationships, and mental illness intervention as social control. *Preq:* SOC 201.

SOC 396 Alcoholism: Social Causes, Consequences and Treatment 3(3,0) Issues involved in alcoholism and alcohol abuse, assessment of sociological and social-psychological theories of alcoholism and prevention; societal problems associated with the misuse of alcohol. Students who have taken SOC 395 may not receive credit for SOC 396. *Preq:* SOC 201 or consent of instructor.

SOC 397 Drug Abuse: Social Causes, Consequences and Treatment 3(3,0) Issues involved in drug abuse other than alcohol; assessment of sociological and social-psychological theories of drug use, abuse, and treatment; societal problems associated with the misuse of drugs other than alcohol. Students who previously have taken SOC 395 may not receive credit for SOC 397. *Preq:* SOC 201 or consent of instructor.

SOC (R S) 401, 601 Human Ecology 3(3,0) See R S 401.

SOC 404, 604 Sociological Theory 3(3,0) Survey of the development of sociological theory. Required of all Sociology majors. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC H408 Honors Thesis Research I 3 Reading and research related to senior honors thesis. Completion of junior honors requirements and approval of department chair and thesis advisor required. *Preq:* SOC H303, H310, honors status.

SOC H409 Honors Thesis Research II 3 Research and writing related to the senior honors thesis. *Preq:* SOC H408, honors status.

SOC 414, 614 Policy and Social Change 3(3,0) Uses the sociological perspective to examine policy development, implementation, and evaluation in the public and private sectors. Specifically, focuses on values and ethics and effects of social change efforts on the outcomes of policy formation, social planning, and implementation. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 430 Sociology of Organizations 3(3,0) Analysis of administrative organizations and voluntary associations; applied analysis of their formal and informal group relations, communications, and effectiveness. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 432 Sociology of Religion 3(3,0) Sociological analysis of religious systems and movements and their influence on other social institutions. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 433, 633 Globalization and Social Change 3(3,0) Examination of the social and historical causes of development and underdevelopment. Various sociological theories of development are reviewed. Selected countries are examined in an international context. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 435, 635 Leadership and Team Building 3(2,3) Introduction to the area of leadership and the process of building effective teams. Examines various sociological perspectives on leadership and their role in developing and maintaining various types of groups. Students are actively involved in the educational process through participation in experiential learning opportunities. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 440, 640 Leisure, the Mass Media, and Culture 3(3,0) Production and consumption of leisure activities in contemporary society; popular culture and the mass media as dominant leisure forms; social effects of leisure activities; relationship between work and leisure. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 441, 641 Sociology of Sport 3(3,0) Sport as a social phenomenon; emphasis on leadership, discrimination, socialization, communication, conflict, and cooperation in sports; emerging social issues in contemporary sports. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC (R S) 459, 659 The Community 3(3,0) See R S 459.

SOC 460, 660 Race, Ethnicity, and Class 3(3,0) Investigation of sociological perspectives on race, ethnic relations, and social stratification. Analysis of the impact of social class on minority movements. Not open to students who have taken SOC 431. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 461 Sex Roles 3(3,0) Female and male socialization; changes in statuses, roles, inequality, and opportunities in contemporary society, with cross-cultural and social class comparisons. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 462 Men, Masculinity, and Society 3(3,0) Masculinity and social order: norms, roles, relationships, and activities; identity and socialization: work, family, sexuality, war, sports, including subcultural comparisons. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 463, 663 Sociology of Parenting 3(3,0) Sociology of parenting; child rearing, parenting styles and outcomes; social change and parenting; variations by sex, race, and class; cross-cultural comparisons; research-based, with applied orientation. *Preq:* SOC 201, Junior standing.

SOC (R S) 471, H471, 671 Demography 3(3,0) See R S 471.

SOC 480, 680 Medical Sociology 3(3,0) Sociocultural factors in the etiology and treatment of physical illness; medical occupations and professions; the organization of health-care delivery systems. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 481, 681 Aging and Death 3(3,0) Sociological orientation to aging populations focusing on the impact of health care, welfare, and retirement systems. Includes dying as a social phenomenon, suicide, euthanasia, and funerals. Not open to students who have taken SOC 383. *Preq:* SOC 201 and Junior standing or consent of instructor.

SOC 484, 684 Child Abuse and Treatment 3(3,0) Comprehensive examination of child abuse, neglect, and exploitation as major social problems; causes, effects, and prevalence of physical, sexual, and emotional maltreatment; definitional controversies; social policy and legal considerations; therapeutic approaches for children and their caretakers; child maltreatment and the judicial system. *Preq:* SOC 201 and Senior standing or consent of instructor.

SOC 491 The Sociology of Policing 3(3,0) Introduction to the major issues of contemporary policing in the U. S. from a sociological perspective. Topics include the changing functions and structure of policing, the police subculture, and the role of the police in a liberal democracy. *Preq:* SOC 390 or consent of instructor.

SOC 493, 693 Sociology of Corrections 3(3,0) Analysis of correctional alternatives. Topics include sentencing strategies and their impact, prison populations (male, female, and juvenile), inmate social structures, treatment and custody issues, community-based alternatives (probation, parole, electronic monitoring, and work release), and correctional management issues. *Preq:* SOC 390 or consent of instructor.

SOC 494, 694 Sociology of Organized Crimes 3(3,0) Examines the multifarious aspects of criminal organizations, namely their structure, methods, and networks. Specific topics may include white-collar crime and traditional, nontraditional, and transnational organized crime. *Preq:* SOC 201 or consent of instructor.

SOC (R S) 495 Field Experience 3(1,8) Students participate in selected field placements under supervision for eight hours weekly and in a one-hour seminar per week. May be repeated once for credit. *Preq:* SOC 380 or 390 and consent of department chair.

SOC (R S) 498 Independent Study 3(1,6) Individual readings or projects in sociological areas not covered in other courses. A written proposal approved by the instructor directing the work and by the department chair prior to registration. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

SOC 499 Seminar in Selected Topics in Contemporary Sociology 3(3,0) Sociological areas of current interest are explored. May be repeated by special arrangement for a maximum of six credits. *Preq:* Consent of department chair.

SPANISH

Professors: C. R. Adams, G. Bautista, P. R. Heusinkveld, S. C. King, M. A. Morris; *Associate Professor:* J. K. Hurley; *Assistant Professors:* N. Corrales, M. M. Rojas-Massei, D. J. Smith, G. E. Tissera; *Lecturers:* S. K. Harris, J. B. Mwynielle, C. A. Robison, M. L. Roth, R. K. Simpson, M. F. Smallwood, S. E. Spacciante

SPAN 101 Elementary Spanish 4(3,1) Course for students with no previous experience in Spanish study. The fundamentals of grammar and vocabulary are taught, and a foundation is provided for building oral and written proficiency. Three hours a week of classroom instruction and one hour a week in the language laboratory.

SPAN 102 Elementary Spanish 4(3,1) Continuation of SPAN 101.

SPAN 104 Basic Spanish 4(3,1) Condensed first-year course for students who have previously studied Spanish. Upon completion, students are prepared to enter Intermediate Spanish.

SPAN 121 Accelerated Spanish 1 8(6,2) Accelerated 8-credit course for students with two or more years of Spanish in high school. May be taken in lieu of SPAN 101 and 102. Through fundamental grammar, conversation, composition, and dictation, proficiency is stressed. May not be taken by students who have completed SPAN 101 or 102.

SPAN 151 Spanish for Graduate Students 3(3,0) Intensive program only for graduate students preparing for the reading examination in Spanish. A minimum grade of B on a final examination will satisfy graduate school foreign language requirement. May be repeated once. To be taken Pass/Fail only. *Preq:* Graduate standing.

SPAN 201, H201 Intermediate Spanish 3(3,1) Intermediate course to practice listening, speaking, reading, and writing. Grammatical structures and basic vocabulary are reviewed systematically. Includes literary and cultural perspectives. *Preq:* SPAN 102, 121, or consent of department chair.

SPAN 202, H202 Intermediate Spanish 3(3,1) Continuation of SPAN 201. *Preq:* SPAN 201.

SPAN 221 Accelerated Spanish II 6(6,0) Accelerated intermediate course that may be taken in lieu of SPAN 201 and 202. Through conversation, composition, dictation, and intensive grammar review, proficiency is stressed. Includes literary readings and cultural perspectives. May not be taken by students who have completed SPAN 201 or 202. *Preq:* SPAN 102, 121, or consent of department chair.

SPAN 299 Foreign Language Drama Laboratory 1(0,3) Participation in foreign language drama productions. No formal class meetings, but an average of three hours per week in a foreign language drama workshop for production. May be repeated for a total of three credits. *Preq:* Consent of instructor directing the play.

SPAN 301 Introduction to Hispanic Literary Forms 3(3,0) Introduction to the basic structures and elements of fiction, poetry, drama, and essay, including literary and critical theory, with readings in 19th and 20th century Spanish and Spanish-American literature. *Preq:* SPAN 202.

SPAN 302 Intermediate Spanish Grammar and Composition 3(3,0) Intensive review of Spanish structure, verbs, idioms, and vocabulary with an introduction to syntax and stylistics through controlled and free composition. *Preq:* SPAN 202 or consent of department chair.

SPAN 303 Survey of Spanish Literature 1 3(3,0) Literary movements, influences, and authors from the beginning to the end of the 17th century; representative works, discussions. *Preq:* SPAN 202 or consent of department chair.

SPAN 305 Intermediate Spanish Conversation and Composition 1 3(3,0) Practice in spoken Spanish with emphasis on vocabulary, pronunciation, intonation, and comprehension; written work to increase accuracy; assignments in the language laboratory. *Preq:* SPAN 202 or consent of department chair.

SPAN 307 The Hispanic World: Spain 3(3,0) Introduction to the significant aspects of the culture of Spain from its origins to the present. Emphasis on the artistic, social, historical, political, and contemporary issues of the Iberian peninsula. *Preq:* SPAN 202 or consent of department chair.

SPAN 308 The Hispanic World: Latin America 3(3,0) Introduction to the significant aspects of the culture of Spanish-American countries. Emphasis is placed on the development of the political, economical, geographical, social, and artistic aspects of Spanish America from the indigenous period to the present. *Preq:* SPAN 202 or consent of department chair.

SPAN 309 Introduction to Spanish Phonetics 3(3,0) Study of basic concepts of phonetics and phonology, fundamental principles of Spanish pronunciation and International Phonetic Alphabet. *Preq:* SPAN 202 or consent of department chair.

SPAN 310 CLIP Summer Immersion Program 6(6,0) Conducted entirely in Spanish for eight hours daily. Consists of activities that combine interrelating cultural topics with language skill practice. Frequent opportunities to converse with

native speakers during meals and on excursions. Students receive six credits, three of which may be taken in lieu of SPAN 202. *Preq:* SPAN 201.

SPAN 311 Survey of Spanish-American Literature 3(3,0) Literary movements, influences, authors, and works from the Colonial period to the present. *Preq:* SPAN 202 or consent of department chair.

SPAN 314 Hispanic Linguistics 3(3,0) Familiarizes students with the theory and practice of linguistics applied to Spanish, in order to deepen their knowledge of phonetics, morphology, syntax, semantics and linguistic change. *Preq:* SPAN 202 or consent of department chair.

SPAN 316 Spanish for International Trade I 3(3,0) Introduction to commercial Spanish; study of the spoken and written language, protocol, and cultural environment of the Spanish-speaking business world. Business vocabulary, basic business and cultural concepts, and situational practice. Grammatical review through business letters, professional documents and commercial reports. Reading and analysis of commercial texts. *Preq:* Any 300-level Spanish language or literature class.

SPAN 318 Spanish Through Culture 3(3,0) Topic-generated conversation course in Spanish through a broad array of artistic manifestations in the Hispanic World, with emphasis in conversation and short written exercises. Focuses on one Hispanic culture topic which provides a basis for class discussion and short written compositions in Spanish. *Preq:* SPAN 202 or consent of department chair.

SPAN (PO SC) 382 Spanish Foreign Language News 1(1,0) See PO SC 382.

SPAN H391 Honors Introduction to Hispanic Literary Forms 1(1,0) One-hour independent study to allow honors students to pursue supervised research on some aspect of Hispanic literature. *Coreq:* SPAN 301, membership in Calhoun Honors College Program.

SPAN H392 Survey of Spanish Literature (Honors) 1(1,0) Independent study allowing honors students to pursue supervised research on witchcraft in 15th and 16th century Spain. *Coreq:* SPAN 303, membership in Calhoun Honors College Program.

SPAN H393 The Hispanic World: Latin America (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on a topic related to Hispanic American history, politics, geography, economics, social institutions, or artistic movements. *Coreq:* SPAN 308, membership in Calhoun Honors College Program.

SPAN 398 Directed Reading 1-3(1-3,0) Directed study of selected topics in Spanish literature, language, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

SPAN 401 New Spanish Fiction 3(3,0) Study of selected readings by popular emerging and established authors of Spain, with emphasis on current cultural trends. Readings include, but are not limited to, detective novels, regional fiction, and fiction from marginalized groups in Spain. *Preq:* SPAN 300-level literature course or consent of department chair.

SPAN 403 Spanish American Women Writers 3(3,0) In-depth study of selected literary works by Spanish American women. Representative authors are studied within their philosophical and socio-political contexts. *Preq:* Spanish 300-level literature course or consent of department chair.

SPAN 404 Nineteenth and Twentieth Century Spanish Literature 3(3,0) Selected readings from major authors in Spain. Emphasis is on readings in poetry, theatre, short story, and novels from the 19th century to the early 20th century. *Preq:* Spanish 300-level literature course or consent of department chair.

SPAN 405 International Trade and Literature 3(3,0) Readings in the social, economic, and political changes of the Hispanic world in fiction and nonfiction. Study of the importance of social changes that have shaped the economies of Hispanic countries. *Preq:* Spanish 300-level literature or culture course or consent of department chair.

SPAN 406 Hispanic Narrative Fiction 3(3,0) Topic-generated readings from Spanish America and/or Spain. Readings consider gender issues, the family, ethnicity, religion, politics, history or socioeconomic issues in the Hispanic world. *Preq:* Spanish 300-level literature or culture course or consent of department chair.

SPAN 407 Hispanic Film 3(3,0) Films are "read" as texts that mirror Hispanic society. Beside learning about cinematographic techniques in Spanish, topics include comparative analysis of film and literature, film as propaganda, film as "blockbuster," and the cinematic depiction of social, cultural, and historical realities of Hispanic nations. *Preq:* Spanish 300-level language, literature, or culture course or consent of department chair.

SPAN 409 Comprehensive Writing in Spanish 3(3,0) Study of stylistics in addition to grammar review; writing paragraphs, short compositions, and creative papers in Spanish on both fiction and non-fiction topics. *Preq:* Any 300-level Spanish course or consent of department chair.

SPAN 411 Advanced Spanish Conversation and Composition 3(3,0) Continuation of SPAN 305 with emphasis on greater fluency and sophistication in oral and written expression. *Preq:* SPAN 305 or consent of department chair.

SPAN 415 Spanish for Health Professionals 3(3,0) Medical concepts and terminology in Spanish; designed for students who plan to work in professions related to public health care. *Preq:* Six credits in Spanish at the 300–400 level.

SPAN 416 Spanish for International Trade II 3(3,0) Study of more complex business vocabulary, cultural concepts, and environment of Hispanic markets. Social, political, and economic issues related to Spanish-speaking countries and their current economies in global marketing. Economic geography of Hispanic countries, company organization, management, banking, investment, goods and services, and marketing. *Preq:* SPAN 316.

SPAN 417 Professional Communication 3(3,0) Skill-oriented course, taught in a seminar format. Students learn established "protocol" for addressing various Spanish-speaking audiences and learn to give professional presentations in Spanish. *Preq:* Spanish 300-level course or consent of department chair.

SPAN 418 Technical Spanish for Health Management Professionals 3(3,0) Technical health communication course in Spanish with emphasis on managerial and business aspects of the international health industry. *Preq:* SPAN 415 and six additional credits in SPAN at the 300–400 level.

SPAN 419 Health and the Hispanic Community 3(3,0) Study of cultural aspects of health and health services in Hispanic populations. Taught in Spanish. *Preq:* SPAN 415 and six additional credits in SPAN at the 300–400 level.

SPAN 422 The Contemporary Spanish-American Novel 3(3,0) New trends in the development of the Spanish-American novel from the 1940s to the present. *Preq:* Spanish 300-level literature course or consent of department chair.

SPAN 435 Contemporary Hispanic Culture 3(3,0) Study of social, political, economic, and artistic manifestations of contemporary Hispanic culture. *Preq:* Spanish 300-level civilization or culture course or consent of department chair.

SPAN H438 Spanish Honors Research 3(3,0) Individual honors research conducted under direction of the Language Department faculty. May not be used to satisfy requirements for the major in Modern Languages–Spanish or Language and International Trade or the minor in Modern Languages. *Preq:* Junior standing, membership in Calhoun Honors College Program.

SPAN H439 Spanish Honors Thesis 3(3,0) Individual honors research conducted and thesis completed under direction of Language Department faculty member. May not be used to satisfy requirements for the major in Modern Languages–Spanish or Language and International Trade or the minor in Modern Languages. *Preq:* Junior standing, SPAN H438, membership in Calhoun Honors College Program.

SPAN H491 Hispanic Narrative Fiction (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research on the socio-political climate under Franco's dictatorship, with emphasis on contemporary literary theory. *Coreq:* SPAN 406, membership in Calhoun Honors College Program.

SPAN H492 Contemporary Latin American Novel (Honors) 1(1,0) One-hour independent study to allow honors students to pursue supervised research in the literary and cinematographic images of magic realism. *Coreq:* SPAN 422, membership in Calhoun Honors College Program.

SPAN 498 Independent Study 1-3(1-3,0-3) Directed study of selected topics in Spanish language, literature, and culture. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

SPAN 499, 699 Special Topics 3(3,0) Study of timely or special topics in Spanish. May be repeated for a total of six credits, but only if different topics are covered. *Preq:* Consent of department chair.

SPECIAL EDUCATION

Professor: A. Katsiyannis; *Associate Professors:* M. J. Hodge, P. M. Stecker; *Assistant Professors:* R. W. Buford, P. J. Riccomini, D. Zhang; *Lecturer:* S. N. Wilson

ED SP 370, H370 Introduction to Special Education 3(3,0) Survey of students with disabilities and with gifts/talents. Individuals with Disabilities Education Act is emphasized, including general educator's role in serving students with special needs. Characteristics, assessment, and effective instructional procedures for students of varying exceptionalities are addressed. *Preq:* Minimum grade-point ratio of 2.0.

ED SP 371 Characteristics of the Mildly Handicapped 3(3,0) Surveys the characteristics which distinguish the mildly/moderately handicapped from the more severely handicapped. *Preq:* Minimum grade-point ratio of 2.0.

ED SP 372 Characteristics and Identification of and Strategies for Individuals with Learning Disabilities 3(3,0) In-depth coverage of characteristics and identification procedures for individuals with learning disabilities. Effective instructional strategies are addressed. Students participate in field experience throughout the semester. *Preq:* ED SP 370; admission to professional level.

ED SP 373 Characteristics and Instruction of Individuals with Mental Retardation 3(3,0) In-depth coverage of characteristics and identification procedures for individuals with mental retardation. Effective instructional strategies are addressed. Students participate in field experiences throughout the semester. *Preq:* ED SP 370; admission to professional level.

ED SP 374 Characteristics and Strategies for Individuals with Emotional/Behavioral Disorders 3(3,0) In-depth coverage of characteristics and identification procedures for individuals with emotional or behavioral disorders. Effective instructional strategies and behavior management are addressed. Students participate in field experiences throughout the semester. *Preq:* ED SP 370; admission to professional level.

ED SP (PRTM) 414, 614 Recreation and Leisure for Special Populations 3(3,0) See PRTM 414.

ED SP 416 Teaching Internship in Special Education 6(1,15) Full-time, supervised teaching internship in K–12 special education for one semester in cooperation with a participating South Carolina school. Reserved for students seeking certification in critical-need teaching areas. May be repeated for a maximum of 12 credits. To be taken Pass/Fail only. *Preq:* ED SP 371, 491, 493, 494, 496; application approved by department.

ED SP 468 Early Intervention for Infants and Children with Special Needs 3(3,0) Provides students with a working knowledge of the history of early intervention, legal precedence for providing early intervention services, and effective instructional techniques for working with infants and young children with disabilities and their families. *Preq:* ED SP 370.

ED SP 469, 669 Characteristics of Individuals with Emotional and Behavioral Disorders 3(3,0) Addresses the characteristics of individuals with emotional and behavioral disorders. Consideration is given to historical and legal aspects, definitions, comprehensive assessment, and the impact of school, home, culture, and society on individuals with behavior disorders. Research findings in the field of behavior disorders are emphasized. *Prq:* ED SP 370.

ED SP 470, 670 Characteristics of Individuals with Learning Disabilities 3(3,0) Provides specific knowledge of definitions, evaluation procedures, cognitive, social, academic, and functional skills of individuals with learning disabilities across the lifespan. *Prq:* ED SP 370.

ED SP 472, 672 Characteristics of Individuals with Mental Retardation 3(3,0) Characteristics of mental retardation across the lifespan: learning, behavioral, and developmental aspects are examined. *Prq:* ED SP 370.

ED SP 473, 673 Educational Procedures for Individuals with Mental Retardation 3(3,0) Identification, selection, and preparation of functional curriculum materials and pedagogy for teaching students with mental retardation. A multidisciplinary, student-centered approach to program planning provides the framework. *Prq:* ED SP 472.

ED SP 474, 674 Procedures for Individuals with Emotional and Behavioral Disorders 3(3,0) Assists students in developing specific strategies for teaching individuals with emotional and behavioral disorders, utilizing preventive measures, expanding skills in behavior analysis, and implementing the least restrictive intervention warranted. Includes programmatic considerations, social skill instruction, curriculum selection, IEP development, and effective transition. *Prq:* ED SP 469.

ED SP 475, 675 Educational Procedures for Individuals with Learning Disabilities 3(3,0) Provides knowledge of educational evaluation and instructional procedures to improve outcomes for individuals with learning disabilities. *Prq:* ED F 302, ED SP 370, PSYCH 201; or consent of instructor.

ED SP 476, 676 Practicum in Learning Disabilities 3(2,3) Addresses content knowledge, skills, and professional values for successful teaching of students with learning disabilities. Focuses on teacher-directed instruction and the use of critical instructional factors, the use of recommended practices for individuals with learning disabilities, and the measurement and analysis of student performance data. *Prq:* ED SP 470, 475; completion of student teaching.

ED SP 478, 678 Practicum in Emotional and Behavioral Disorders 3(2,3) Addresses content knowledge, performance skills, and professional values for successful teaching of students with emotional and behavioral disorders. Focuses on teacher-directed instruction and the use of critical instructional factors, the use of recommended practice for students with disabilities, and the measurement and analysis of student performance data. *Prq:* ED SP 474; completion of student teaching.

ED SP 479, 679 Practicum in Mental Retardation 3(2,3) Addresses content knowledge, performance skills, and professional values for successful teaching of students with mental retardation. Focuses on teacher-directed instruction and the use of critical instructional factors, the use of recommended practices for students with disabilities, and the measurement and analysis of student performance data. *Prq:* ED SP 473; completion of student teaching.

ED SP 491: Educational Assessment of Individuals with Disabilities 3(2,2)S Introduction to assessment process (verification) in special education. Includes procedural safeguards; data collection via informal and standardized procedures; issues in assessment; psychometric properties of standardized tests; and administration, scoring, and interpretation of selected instruments. *Prq:* ED SP 372, 373.

ED SP 492 Mathematics Instruction for Individuals with Mild Disabilities 3(3,0)F Prepares students to provide explicit instruction in mathematics for individuals with mild disabilities. Students learn to systematically assess, analyze, and teach math skills. *Prq:* ED SP 374, 491; concurrent enrollment in ED SP 493, 494, 496, 497.

ED SP 493 Classroom and Behavior Management for Special Educators 3(3,0)F Students describe various intervention strategies for increasing and maintaining appropriate behaviors and for decreasing or eliminating inappropriate behaviors. Students accurately recognize, record, and chart inappropriate behaviors; employ the least restrictive intervention; foster self-management skills; and develop preventive strategies and classwide systems for managing academic and social behavior. *Prq:* ED SP 374, 491; concurrent enrollment in ED SP 492, 494, 496, 497.

ED SP 494 Teaching Reading to Students with Mild Disabilities 3(3,0)F Emphasizes the knowledge and skills necessary for teaching reading to students with mild disabilities. *Prq:* ED SP 374, 491; concurrent enrollment in ED SP 492, 493, 496, 497.

ED SP 495 Written Communication and Collaboration for the Resource Teacher 3(3,0)W3S Focuses on the development of written communication skills to enhance special education teachers' collaboration with parents, regular educators, public and private agencies. *Prq:* ED SP 492, 493, 494, 496; concurrent enrollment in ED SP 416 or 498.

ED SP 496 Special Education Field Experience 3(0,9)F Supervised practical experience prior to Directed Teaching for preservice special education teachers preparing to teach individuals with mild/moderate disabilities. *Prq:* ED SP 374, 491; concurrent enrollment in ED SP 492, 493, 494, 497.

ED SP 497 Secondary Methods for Individuals with Disabilities 3(3,0)F Preparation for working with students with mild/moderate disabilities in secondary schools. Focus is on literature, methods, and materials for providing instruction in content, self-determination, knowledge within content areas, functional skills, and integration into the community. *Prq:* ED SP 374, 491; concurrent enrollment in ED SP 492, 493, 494, 496.

ED SP 498 Directed Teaching in Special Education 12(1,3)S Comprehensive course providing a full-time, semester-long experience for preservice special education teachers who plan to teach individuals with mild/moderate disabilities. Generally the last course in the program; provides teaching experience under the supervision of University and school personnel. *Prq:* ED SP 492, 493, 494, 496, 497; concurrent enrollment in ED SP 495.

TECHNOLOGY AND HUMAN RESOURCE DEVELOPMENT

Professors: W. L. Havice, C. H. Isbell, G. G. Lovedahl, W. D. Page; *Associate Professor:* C. C. Linnell; *Assistant Professors:* C. E. P. Evans, P. H. McGee; *Visiting Instructors:* M. V. Crenshaw, W. B. Doty

THRD 110 Introduction to Industrial Technology 3(3,0) Examines the philosophy and structure of industrial technology education in the public school system and the philosophy and organization of human resource development in industry. Students are given an orientation to the major in Technology and Human Resource Development and an overview of the principles of technology.

THRD 160 Training Programs in Industry 3(3,0) Introduction and first-hand experience in industrial training programs. Emphasis is on observing and participating in actual training situations as well as communications and media usage in industry. *Prq:* THRD 110.

THRD 180 Introduction to Technical Drawing and Computer-Aided Drafting 3(1,6) Introductory drafting course utilizing traditional drafting techniques and computer software to explore technical drawing and orthographic projection through construction of multiview and isometric projections, sectional and auxiliary views, dimensioned working drawings, developments, and intersections. Freehand sketching is a means of problem solving and analysis.

THRD 181 Advanced Technical Drawing and Computer-Aided Drafting 3(1,6) Students expand the application of computer-aided drafting in the areas of mechanical and architectural drawing. Emphasis is on development of complete working drawings incorporating instruction in the areas of production, manufacturing, and construction. *Prq:* THRD 110, 180 or equivalent; consent of instructor.

THRD 220 Manufacturing Technology I: Systems 3(2,3) Introduction to management, personnel, and production systems studies through the creation of a corporation. Includes product identification, product research and design, selection of processes, plant design, production systems, and system enhancement. *Prq:* THRD 110 or consent of instructor.

THRD 224 Machine Tool Processes 3(2,3) Basic practical shop experiences on the lathe, drill press, milling machine, and shaper. Benchwork, measuring tools, theory, and demonstrations related to a survey of fundamental machining practices.

THRD 230 Construction Technology I: Materials 3(2,3) Introduction to the commonly used building materials and methods of combining them in present day construction. *Prq:* THRD 110 or consent of instructor.

THRD 240 Power Technology I: Production 3(2,3) Study of power in terms of energy sources and the generation of power. Emphasis is on the development of insights and understandings of the scientific and operational principles involved in the production and utilization of power. *Preq:* THRD 110 or consent of instructor.

THRD 250 Electricity 3(2,3) Theory and application of DC and AC fundamentals, including instrumentation, power sources, circuit analysis, motors, construction wiring, and electronic principles and components.

THRD 280 Communications Technology I: Processes and Materials 3(2,3) Topics include graphic communications, photography, computer application and use as a visual communication medium, and audio/video production and application.

THRD 310 Arts and Creativity for the Elementary Child 3(2,3) Provides elementary and early childhood teachers an opportunity to develop technological literacy, art/craft skills in a variety of media, and an understanding of their applications to the curriculum in a classroom environment. *Preq:* Junior standing in Early Childhood or Elementary Education or consent of instructor.

THRD (ED F) 315 Integrating Computers into the Classroom 1(0,2) See ED F 315.

THRD 360 Industrial Organizations and Safety 3(3,0) Study of the relationship of training and safety personnel to the kinds of tasks they are asked to perform in industrial situations. Emphasis is on safety knowledge development and on techniques which may be used in industrial safety training.

THRD 370 Motivation and Discipline in Vocational Education 3(3,0) Provides classroom teachers and prospective teachers with knowledge and skills in techniques of student discipline and motivation with application to the occupational education settings.

THRD 371 Management of Industrial Education Laboratories 3(2,2) Management and operation of unit and multiple-activity laboratories, including laboratory design, selection and procurement of tools and equipment, budgeting management, and coordination of activities in laboratory courses.

THRD 390 Industrial Cooperative Experience I 6(0,18)SS Full-time work experience in industry. Students are requested to register with the instructor one semester prior to the summer in which they plan to enroll. *Preq:* Vocational-Technical Education concentration only.

THRD 410, 610 Selected Topics 1-3(1-3,0) Subject areas organized according to program needs. Content is planned cooperatively by the University and the school system or agency requesting the course. May be repeated for a maximum of 18 credits, but only if different topics are covered. *Preq:* Consent of instructor.

THRD 413, 613 Contemporary Technological Problems 3(3,0) Provides students with an understanding of the problems and contributions of technology. Examples of these relationships are taken from historical accounts and from analyses of contemporary technological intervention both in industrialized and nonindustrialized countries.

THRD 415, 615 History and Philosophy of Industrial and Vocational Education 3(3,0) Study of industrial and vocational education programs with the intent of developing a sound individual philosophy of industrial and vocational education. General topics covered are history; local, state, and federal legislation; types of vocational-technical programs; professional organizations; manpower utilization, vocational guidance, and training; industry, labor, and school relationships.

THRD 420, 620 Manufacturing Technology II: Materials and Processes 3(2,3) Continuation of THRD 220 with emphasis on materials and processes of manufacturing. Attention is given to specific materials separating, forming, and combining practices and equipment and on the competitive aspects of manufacturing. *Preq:* THRD 220 or consent of instructor.

THRD 430, 630 Construction Technology II: Practices and Systems 3(2,3) Study of industrial practices and systems affecting man, materials, and equipment associated with construction industries. Activities are directed toward developing a working knowledge of construction technology and a framework for incorporating this instruction into programs in the public and private sectors. *Preq:* THRD 230.

THRD 440, 640 Power Technology II: Transmission and Control Systems 3(2,3) Continuation of THRD 240. Instruction in transmitting and controlling power for utilization in such areas as manufacturing, communications, construction, and transportation. Introduces concepts of automation and robotics to enable the classroom teachers and industry personnel to gain necessary insights into this important area of technology. *Preq:* THRD 240.

THRD 450 Electronics for Educators 3(1,6) Principles of electronics as applied in communications and automatic controls involving transistors, integrated circuits, and other electronic devices and materials for the preparation of teachers of industrial arts and vocational-technical electricity and electronics. *Preq:* THRD 250 or equivalent.

THRD 460, 660 Developing Training Programs for Industry 3(3,0) Identification, selection, and organization of subject matter for industrial training programs. Emphasizes analysis techniques, session and demonstration planning, written instructional materials development, trainee evaluation, and planning instructional schedules. *Preq:* Senior standing in Human Resource Development concentration or consent of instructor.

THRD 465, 665 Conducting and Evaluating Training Programs for Industry 3(3,0) Basic concepts of supervision, administration, and management of training programs. Emphasis is on determining training requirements, planning, directing, and evaluating training programs. *Preq:* THRD 160, 460 or consent of instructor.

THRD 468, 668 Public Relations 3(3,0) Emphasizes techniques and methods of effective public and industrial relations which contribute to understanding and cooperation of labor, business, professional, educational, and industrial groups.

THRD 470, 670 Course Organization and Evaluation 3(3,0) Problems, techniques, and procedures in the preparation, selection, and organization of subject matter for instructional purposes. Methods, techniques, and preparation of materials used in the evaluation of student achievement in industrial education subjects.

THRD 471, 671 Teaching Industrial Subjects 3(3,0) Effective methods and techniques of teaching industrial subjects. Emphasis is given to class organization, preparation of lesson outlines and audio-visual aids. *Preq:* ED F 335.

THRD 472 Advanced Instructional Methods 3(3,0) Familiarizes students with the various equipment, materials, and techniques associated with the delivery of instruction. Students design, produce, and present materials to meet specific educational objectives. *Preq:* THRD 471 or one year of teaching experience.

THRD 473, 673 Competency Testing in Vocational Subjects 3(3,0) Study of competency testing in vocational education which includes educational objectives and measurement, construction and use of oral, objective, short answer, matching, essay, and performance tests; and treatment of test data for grade assignments and statistical analysis.

THRD 477 Directed Teaching 12(0,36) Supervised observation and teaching in cooperation with selected public schools in which opportunities are provided for securing experience in teaching industrial subjects. *Preq:* THRD 371, 471, 2.0 cumulative grade-point ratio.

THRD 478 Internship in Vocational Technical Education I 6(0,18) Supervised observation and teaching in cooperation with selected area vocational centers, high schools, and technical colleges to provide experience in teaching specified trades and industrial subjects. *Preq:* THRD 371, consent of instructor.

THRD 479 Internship in Vocational Technical Education II 6(0,18) Continuation of THRD 478. *Preq:* THRD 478, consent of instructor.

THRD (AG ED, ED F) 480, 680 Educational Applications of Microcomputers 3(2,2) [C.3] See ED F 480.

THRD (AG ED, ED F) 482, 682 Advanced Educational Applications of Microcomputers 3(2,2) See ED F 482.

THRD 483, 683 Architectural Drafting for Industrial Education 3(1,6) Study of the major aspects of architectural drawing, such as plot, floor, and foundation plans; wall sections; and elevations. *Preq:* THRD 180.

THRD 484, 684 Communications Technology II: Systems 3(2,2) Continuation of THRD 280. Includes theory and operation of communications systems: telegraph, telephone, radio, television, satellites, sound/video recorders, lasers, and computers. Instruction on strategies for interpreting this area of technology to industry personnel and public school students is emphasized. *Preq:* THRD 280.

THRD 486, 686 Instructional Media Development 3(1,4) Basic instructional media development techniques are presented. Students develop material using authoring software such as HyperCard, transparencies using Persuasion and/or PowerPoint, and fully storyboarded, scripted, and edited digital as well as analog video.

THRD 490 Industrial Cooperative Experience II 6(0,18) Continuation of THRD 390. *Prq:* Vocational-Technical Education concentration only.

THRD 491 Special Projects 3(3,0) Students are assigned projects in accordance with their needs and capabilities. Projects are either experimental, theoretical, or developmental and cover subjects not thoroughly covered in other courses. Written project approval required before registering. *Prq:* Consent of instructor.

THRD 492, 692 Advanced Projects 1-6 Students gain depth in content by completing projects under the supervision of an instructor in one of the following subject areas: arts and crafts, drawing and design, electricity and electronics, graphic arts, metalworking, occupational education, power, and woodworking; written project approval required before registering. May be repeated twice for a maximum of six credits. *Prq:* Consent of instructor.

TEXTILE MANAGEMENT

Professors: J. R. Aspland, S. B. Bhaduri, D. A. Brosnan, M. J. Drews, M. S. Ellison, *Director:* B. C. Goswami, C. W. Jarvis, B. I. Lee, H. J. Rack, C. D. Rogers, E. A. Vaughn; *Associate Professors:* J. M. Ballato, S. H. Foulger, G. C. Lickfield, E. C. Skaar, T. D. Taylor; *Assistant Professors:* P. Brown, J. Luo, I. A. Luzinov

TEXT 175 Introduction to Textile Manufacturing 3(3,0) Introduction to the broad fields of textile, fiber, and polymer science and engineering with emphasis on the scientific, technological, and business principles utilized in producing fibers, yarns, and fabrics; enhancing fabric functionality by dyeing, finishing, and printing; and establishing end-use products.

TEXT 176 Natural and Man-made Fibers 4(3,3) Concept of natural and synthetic polymers as the raw materials of the textile industry is introduced. Survey of the origin, characteristics, and processing properties of various natural fibers and fiber-forming synthetic polymers. Formation of textile fibers from polymeric materials is presented with specific emphasis on the polymer science and engineering principles.

TEXT 201 Yarn Structures and Formation 4(3,3) Study of fiber processing systems required to transform various fibrous materials into yarn. Involves the machine principles and theories, relationship of the fibers to the process and the resultant yarn structures, and subsequent analysis of the yarn structure to define quality and to determine suitable manufacturing practices. *Prq:* TEXT 175 and 176 or consent of instructor.

TEXT 202 Fabric Structures, Design, and Analysis 4(3,3) Study of fabric formation techniques designed to explore the principles and theories of modern technology. Evaluation and analysis of weaving, knitting, and nonwoven fabrication of textile structures. *Prq:* TEXT 201 or consent of instructor.

TEXT 308 Apparel 4(3,3) Introduction to apparel construction techniques and analysis of problems commonly encountered in the apparel industry. Evaluation of fabric design and properties. *Prq:* TEXT 202 or consent of instructor.

TEXT 314 Chemical Processing of Textiles 4(3,2) Concepts of current procedures in the chemical, mechanical, and physical preparation and in bleaching, dyeing, printing, and finishing of fabrics are presented; colorimetric and spectrophotometric methods of color control and test methods for the evaluation of the effectiveness of the treatments are emphasized. Not open to Polymer and Textile Chemistry or Textile Management (Chemical) majors.

TEXT 324 Textile Statistics 3(3,0) Introduction to statistics with particular application to the textile industry. Measures of central value and variation, probability, the normal curve, tests of hypotheses, elementary correlation, and regression. *Prq:* Sophomore standing or consent of instructor.

TEXT 333 The Textile Arts 3(2,3) Surveys development of the hand loom from prehistoric times to the present. Studio work in the elements of hand-woven fabrics, their design, analysis, and production of four-harness counterbalance and jack looms. *Prq:* Junior standing or consent of instructor.

TEXT 403 Fiber Processing III 3(2,2) Concepts of current fiber processing machines, techniques, practices, and their validity are investigated. Problems are assigned that require use of acquired knowledge, textile testing equipment, and processing machines. The relation of fibrous material properties and processing dynamics to the fiber assemblies produced is studied. *Prq:* TEXT 201.

TEXT 411 Fabric Development III 3(2,2) Study of specifications and loom details for the production of fabrics woven to the customer's order, including multicolor layouts. Warp and filling preparation are covered as well as size formulations and their methods of application. Warping and dressing plans are developed for the warper and the slasher. *Prq:* TEXT 202.

TEXT 414 Knitted Structures 3(3,0) Survey of knitted structures dealing with the principles and mechanisms involved. Various systems are covered with emphasis on fiber and yarn requirements and fabric properties.

TEXT 416 Nonwoven Structures 3(2,2) Nonwoven fabric structures, their manufacture, properties, and applications. Methods of nonwoven fabric formation, resultant material characteristics and end-use applications are examined. *Prq:* TEXT 201.

TEXT 421, H421, 621 Fiber Science 3(2,2) Familiarizes students with the physical properties of textile and high performance fibers and how these properties influence process and end-use performance; method of measuring those properties; and how those properties are related to structural features of the fiber.

TEXT 422, 622 Properties of Textile Structures 3(2,2) Yarn and fabric properties, their scientific significance and analysis. Dimensional, structural, and mechanical interrelationships are established and evaluated.

TEXT 426, 626 Instrumentation 3(3,0) Principles of industrial and process instrumentation and control as applied in the textile industry; static and dynamic characteristics of measurement devices; transducer principles and techniques of their application for measurement of physical

properties such as pressure, temperature, flow, weight, etc.; principles of process controllers; applications of computers in textile process control.

TEXT 428 Textile Research 1-3 Investigation of a problem in textile, fiber, or polymer science under the direct supervision of a faculty member. After completing the research, student prepares a formal written report which is presented orally. *Prq:* Senior standing or consent of instructor.

TEXT 429 Textile Research 1-3 Continuation of TEXT 428.

TEXT 440 Color Science 3(2,3) Application of the science of color to industrial practice in textiles, plastics, paints, lighting, and ceramics. Laboratory work is performed on modern instruments and computers.

TEXT 445, 645 Special Topics in Textile, Fiber, and Polymer Science 1-3(1-3,0) Special topics in textile, fiber, and polymer sciences. A co-enrollment course for similar courses in other departments such as for those students involved in CAEFF projects and CH E 445. There may be different sections in a term to cover different credits, but only if different topics are covered. *Prq:* Consent of instructor.

TEXT 460, 660 Textile Processes 3(3,0) Survey of machinery and processes of textile manufacturing from fiber formation through fabric finishing. For students with a nontextile background.

TEXT 470 Textile Costing and Inventory Control 3(3,0) Study of the principles of costing as they specifically apply to the manufacture of textiles. Allocation of cost of material, labor, and overhead; determining the unit cost of yarns, fabrics, and finishes. Inventory systems, storage, materials handling, and profiles. *Prq:* TEXT 202 or consent of instructor.

TEXT 471 Plant Layout and Processing Design 3(3,0) Survey of the essentials necessary for textile process implementation from the pilot plant concept to a functioning textile process facility. Material flow requirements, power requirements, machinery layout, environmental controls, and facility design are considered. *Prq:* TEXT 202.

TEXT 472, 672 Textile International Trade 3(3,0) Analyzes the current structure of the international textile trade including imports, exports, tariffs, and trade requirements. Field experience with local firms is used to enhance students' understanding. *Prq:* Senior standing or consent of instructor.

TEXT 475, 675 Textile Marketing 3(3,0) Examination of the activities involved in the distribution of textile products in today's market. Emphasis is placed on the role of consumer research and the analysis of fashion in the design and promotion of textile products.

TEXT 476, 676 Carpet Manufacturing 3(3,0) Study of the materials, manufacturing technologies, products, and practices associated with the carpet manufacturing sector of the textile industry. Raw materials, product design, formation and finishing systems, evaluation methods, distribution, and end-use applications are examined. *Prq:* TEXT 201, 202, or consent of instructor.

THEATRE

Professors: C. S. M. Egan, D. J. Hartmann, R. C. Sawyer; *Assistant Professors:* H. Currie, K. Johnson, S. S. Kearney; *Lecturer:* C. A. Collins

THEA 120, H210 Theatre Appreciation 3(3,0)

Examination of the theatre event approached through historical context, play reading, analysis of production practices, and field trips to live dramatic performances.

THEA 267 Stage Makeup Techniques 3(2,1)

Practical study of basic stage makeup techniques for the acting student including corrective makeup, modeling with paint, three-dimensional makeup, prosthesis with latex, and makeup for other media.

THEA 277 Production Studies in Theatre 3(3,0)

Study of technical production and design including scenery, costume, and lighting through the examination of plays in production.

THEA 278 Acting I 3(2,3)

Fundamentals of acting; basic stage techniques; exercises in interpretation, improvisation, characterization; experience in supervised scene study.

THEA 279 Theatre Laboratory I (0,3)

Practical work in theatre on a production designed for public presentation. May be repeated for a maximum of four credits.

THEA 315 Theatre History I 3(3,0)

Historical survey of Western theatre; emphasis is placed on the changing roles of the playwright, director, actor, technician, and spectator from antiquity to the Renaissance. *Preq:* Sophomore standing.

THEA 316 Theatre History II 3(3,0)

Historical survey of Western theatre; emphasis is placed on the changing roles of the playwright, director, actor, technician, and spectator from the Renaissance to the present. *Preq:* Sophomore standing.

THEA 317 African American Theatre 3(3,0)

Acquaints students with the origin and development of African American playwrights, plays, players, and their contributions to the American theatre from the 19th century to the present.

THEA (ENGL) 347 The Structure of Drama 3(3,0)

Introduction to the creative writing and critical study of drama. *Preq:* ENGL 310 or consent of instructor.

THEA 367 Costume Technology 3(2,3)

Theory and practice of costume technology including equipment, patterning, fabric identification, cutting, construction, and fitting.

THEA 368 Voice for the Stage 3(2,3)

Study of the principles of vocal production and standard American speech for the stage; exercises in breath support and projection, improving tonal quality, and elimination of regional dialects through the study of the International Phonetic Alphabet. *Preq:* Sophomore standing.

THEA 372 Creative Drama 3(3,0)

Practical applications using creative drama as a learning tool to strengthen curriculum goals and heighten student participation in the classroom. Students develop classroom teaching strategies based on drama education. Appropriate for elementary and secondary teachers, artists, and workshop leaders.

THEA 374 Stage Movement for Actors 3(1,2)

Study of the psychological and physical sources of movement in the human body, with emphasis on the attainment of intellectual and physical control and the application of the skills to the development of a role.

THEA 376 Stage Directing I 3(2,3)

Directing and staging techniques for the proscenium stage; exercises in composition, movement, picturization; experience in direction of scenes. *Preq:* Sophomore standing.

THEA 377 Stagecraft 3(2,3)

Theory and practice of stage design and technology. *Preq:* Sophomore standing.

THEA 379 Acting Ensemble I (0,3)

Performance opportunities in the area of theatre for young audiences. Students are members of a theatrical touring troupe and perform in a variety of spaces and locations. May be repeated for a maximum of four credits. By audition only.

THEA 398 Special Topics in Theatre 3(3,0)

Select areas of study in theatre not addressed by other theatre course offerings. May be repeated once. *Preq:* Consent of instructor.

THEA (ENGL) 447 Playwriting Workshop 3(0,3)

[W.3] Workshop in the creative writing of plays. May be repeated once. *Preq:* THEA (ENGL) 347 or consent of instructor.

THEA 467 Costume Design 3(3,0)

Theory and practice of costume design for the theatre including the study of production concept and styles, sketching, and rendering. *Preq:* THEA 367 or consent of instructor.

THEA 472, 672 Improvisation: Interpreting and Developing Texts 3(3,0)

Practical applications using drama as a learning tool to strengthen writing skills, motivate collaboration, heighten analytical skills. Students use improvisation to analyze texts and to revise original work, consider theory and research of contemporary scholars, and develop approaches to literature and composition based on readings and drama experiences. *Preq:* Senior standing or consent of instructor.

THEA 476 Stage Directing II 3(2,3)

Continued study in the art of stage directing, emphasizing leading contemporary theory and methodology. Culminates in the production of a one-act play for public presentation. *Preq:* THEA 376 or consent of instructor.

THEA 477 Stage Design 3(2,3)

Study and practice in stage design, including drafting, graphics, drawing, rendering, scene painting, and light plotting. *Preq:* THEA 377 or consent of instructor.

THEA 479 Acting II 3(2,3)

Continued study in the craft of acting for contemporary Western theatre. Students focus on monologue and scene study in a variety of performance settings. *Preq:* THEA 375 or consent of instructor.

THEA 487, 687 Stage Lighting 3(2,1)

Theory and practice of stage lighting through an understanding of various lighting instruments, lighting control systems, and execution of lighting designs.

THEA 497, 697 Scene Painting 3(2,1)

Practical study of basic painting techniques for the theatre including layout, proper use of materials, painting styles, and texturing techniques.

THEA 499, 699 Independent Studies 1-3(1-3,0)

Tutorial work for students with special interests outside the scope of existing courses. May be repeated for a maximum of six credits. *Preq:* Consent of department chair.

WILDLIFE AND FISHERIES BIOLOGY

Professors: A. G. Eversole, J. W. Foltz, J. J. Isely, T. E. Schwedler, J. R. Sweeney, *Chair:* J. R. Tomasso, Jr., G. W. Wood; *Associate Professors:* C. R. Allen, J. D. Lanham; *Assistant Professors:* W. W. Bowerman, A. R. Johnson

W F B 101 Introduction to Wildlife and Fisheries Biology 1(1,0)

F Informative sketch of aquaculture, fisheries science, and wildlife management. Introduces principles, resources, professional organizations, and careers in these fields. *Preq:* Major in Wildlife and Fisheries Biology or consent of instructor.

W F B 102 Methods of Wildlife and Fisheries Biology 1(0,2)

F Introduction to methodology used in aquaculture, fisheries science, and wildlife management. Students are introduced to terminology, techniques, laws, and legislations. Skills with dimensions, units, computations, and technical communications as applied to aquaculture, fisheries, and wildlife. Open only to Wildlife and Fisheries Biology majors. *Coreq:* W F B 101.

W F B 300 Wildlife Biology 3(3,0)

Natural history, biology, and conservation of wildlife managed by natural resource agencies. Attention is given to those factors important in the management and conservation including species distribution and abundance, habitat requirements, and life-history characteristics. Principles and problems associated with conservation of selected wildlife species are covered. *Preq:* Two semesters of introductory biology.

W F B 301 Wildlife Biology Laboratory 1(0,3)

Identification of wildlife species with emphasis on game and non-game wildlife species managed or protected by state and federal agencies. One or more required weekend field trips will be scheduled. Open only to Wildlife and Fisheries Biology majors. *Coreq:* W F B 300.

W F B 306 Introduction to Wildlife Conservation 2(2,0)

F S Examines the fundamental thinking upon which modern conservation programs have been built.

W F B 307 Hunting and Wildlife Management 1(1,0)

S Hunting techniques used to harvest renewable wildlife resources are examined with respect to their roles in sound management practices. The effects of selected hunting regulations on wild populations, safety, and ethics are discussed. *Preq:* Junior standing or consent of instructor.

W F B (BIOSC) 313 Conservation Biology 3(3,0)

Study of the biological bases for the conservation of flora, fauna, and habitats. Biological factors that influence the decision making process are also addressed. *Preq:* One year of general biology or consent of instructor.

W F B 350 Principles of Fish and Wildlife Biology 3(3,0) Introduction to principles of fisheries and wildlife biology on which sound management practices are based. Interrelationships of vertebrate and invertebrate biology, habitat, and population dynamics are covered. *Preq:* One year of general biology.

W F B 412, H412, 612 Wildlife Management 3(2,3) S Basic principles and general practices of wildlife management and conservation are covered. Major problems concerning the management of wildlife resources, with emphasis on upland game species. Laboratory work includes practical work on the Clemson University woodlands and field trips to several areas where wildlife management is being practiced.

W F B 414, 614 Wildlife Nutritional Ecology 3(3,0) S Concepts of how terrestrial wildlife obtains and utilizes energy and nutrients in wild ecosystems are taught. Energy and nutrient availability are discussed in the ecological context of distribution, flow, and cycling in natural and modified foraging areas. Physiology of digestion is discussed for major homeotherms. *Preq:* FOR 415 or W F B 412.

W F B 416, 616 Fishery Biology 3(2,3) F Principles underlying freshwater fish production. Introduction to major groups of freshwater fishes and their habitats. Topics include identification, age and growth, fecundity, food habits, populations estimation, environmental evaluation, management practices, and fish culture. *Preq:* One year of introductory biology, Junior standing.

W F B 418 Fishery Conservation 3(3,0) Survey of conservation efforts directed toward freshwater and marine fisheries resources. Topics include threatened, endangered, over-exploited species and introductions of exotic species. *Preq:* Two semesters of introductory biology.

W F B 430, 630 Wildlife Conservation Policy 3(3,0) Deals with the ecological rationale and management implications of public policy designed for the conservation of American wildlife resources. Emphasis is on managed-land issues. *Preq:* W F B 350 or consent of the instructor.

W F B 440 Non-game Wildlife Management 3(3,0) Basic principles and general practices of non-game wildlife management are covered. Emphasis is placed on those principles and practices most appropriately used by state agencies in their management programs for non-game species, along with real-world problems associated with implementation of such programs. *Preq:* Two semesters of introductory biology.

W F B 450, 650 Aquaculture 3(3,0) Basic aquacultural techniques applied to freshwater and marine organisms; past and present culture of fin-fishes and shellfishes around the world; principles underlying fish production; water quality, feeding, and nutrition as they influence production of cultured aquatic organisms. *Preq:* One year of general biology, Junior standing.

W F B 460, 660 Warmwater Fish Diseases 2(2,0) Study of diseases in warmwater fish including infectious and noninfectious processes. *Preq:* One year of general biology, Junior standing, consent of instructor.

W F B 462, H462, 662 Wetland Wildlife Biology 3(3,0) F Study of wetland wildlife habitats, emphasizing classification by physical, chemical, and biological characteristics; importance of wetland habitat for management and production of wetland wildlife species. *Preq:* BIOL 103/104 or 110/111.

W F B 463 Directed Research in Aquaculture, Fisheries, and Wildlife Biology 1(0,3) F, S Research problems in selected areas of aquacultural, fisheries, or wildlife science to introduce students to experimental design, research techniques, and presentation of research results. May be repeated for a maximum of three credits. *Preq:* Junior standing, consent of instructor.

W F B (BIOSC, ENT) 469, H469, 669 Aquatic Insects 3(1,6) S Odd-numbered years. See ENT 469.

W F B 490 Field Training in Aquaculture, Fisheries, and Wildlife 6(0,18) Eight-to-ten-week program in which students observe aquaculture, fisheries, or wildlife management. Students have supervised management responsibility. Total of 270 hours required. Must be arranged at least two months in advance. To be taken Pass/Fail only. *Preq:* Senior standing in Wildlife and Fisheries Biology or consent of instructor.

W F B 493 Selected Topics 1-4(0-4,0-12) Specialized topics which explore current areas of research and management in aquaculture, fisheries science, or wildlife management are examined in lecture/seminar format. May be repeated for a maximum of ten credits, but only if different topics are covered. *Preq:* Junior standing, consent of instructor.

W F B 499 Wildlife Biology and Fisheries Seminar 1(1,0) Exploration of current literature and research in fisheries and wildlife sciences. Students participate in the analysis of research findings, utilizing skills acquired in their undergraduate programs. May be repeated once for credit.

WOMEN'S STUDIES

Professor: J. M. Melton; *Associate Professor:* E. K. Sparks; *Assistant Professor:* M. Shockley; *Lecturer:* S. Watts

W S 301 Introduction to Women's Studies: Women's Lives 3(3,0) Interdisciplinary course exploring the unique features of women's lives from childhood to old age. Content is based on new research in many disciplines, including psychology, sociology, history, literature, and the arts. *Preq:* Sophomore standing.

W S 459, 659 Selected Topics in Women's Studies 1-3(1-3,0) Topics change from semester to semester and are announced prior to registration. May be repeated for a maximum of six credits, but only if different topics are covered.

W S 498 Advanced Studies in Women's Studies 3(3,0) Focuses on the theoretical foundations for women's studies, with particular emphasis on how women's studies research and theory influence institutions and governmental policies. Readings include essays on such central women's studies issues as work, family, children, health care, legislation, and government policies. *Preq:* W S 301 or consent of instructor.

FACULTY

Abbott, Albert G., *Professor, Genetics, Biochemistry, and Life Science Studies*. BS, University of Connecticut, 1976; PhD, Brown University, 1980

Abercrombie, John G., *Lecturer, Biological Sciences*. BS, Furman University, 1995; MS, Clemson University, 2001

Abramovitch, Rudolph A., *Professor, Chemistry*. BS, Alexandria University (Egypt), 1950; PhD, 1953, DSc, 1964, University of London (England)

Acocck, Basil, *Adjunct Professor, Horticulture*. BSc, Reading University (England), 1962; MS, Clemson University, 1963; PhD, Nottingham Trent University (England), 1967

Adams, Clementina R., *Professor, Languages*. BA, Atlantico University (Colombia), 1969; MS, 1974, PhD, 1984, Florida State University

Adams, Leroy Shealy, *Lecturer, Development*. BS, Clemson University, 1963

Adams, Tim O., *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, 1977, MS, 1979, North Carolina State University; PhD, Clemson University, 1992

Adams, Warren P., *Professor, Mathematical Sciences*. BS, Lewis University, 1979; MS, 1981, PhD, 1984, Virginia Polytechnic Institute and State University

Adelberg, Jeffrey W., *Research Associate/Assistant Professor, Horticulture*. BS, 1982, MS, 1987, Rutgers University; PhD, Clemson University, 1993

Adler, Peter H., *Professor, Entomology, Soils, and Plant Sciences*. BS, Washington and Lee University, 1976; MS, 1979, PhD, 1983, Pennsylvania State University

Alexander, John C., Jr., *Breazale Professor, Financial Planning*. BBA, 1984, MBA, 1985, Stetson University; PhD, Florida State University, 1991

Alexander, Kim E., *Lecturer, Center for Safety Research and Education*. MS, 1988, MEd, 1992, Clemson University

Allen, Benjamin L., Jr., *Adjunct Professor, Bioengineering; Chief of Staff, Greenville Unit, Greenville Hospital System*. BS, Wofford College, 1960; MD, Duke University, 1964

Allen, Craig R., *Assistant Professor, Forestry and Natural Resources and Biological Sciences*. BS, University of Wisconsin, 1989; MS, Texas Technical University, 1993; PhD, University of Florida, 1997

Allen, Dennis M., *Adjunct Professor, Forestry and Natural Resources*. BS, Hobart College, 1972; MS, 1974, PhD, 1978, Lehigh University

Allen, Lawrence R., *Dean, College of Health, Education, and Human Development; Professor, Parks, Recreation, and Tourism Management*. BS, West Chester State University, 1970; MS, 1974, PhD, 1979, University of Maryland

Allen, William H., *Department Chair and Professor, Agricultural and Biological Engineering*. BS, 1966, MS, 1969, Clemson University; PhD, University of Tennessee, 1972

Alley, Pamela R., *Lecturer, Psychology*. BA, 1975, MA, 1978, PhD, 1983, University of Connecticut

Alley, Thomas R., *Professor, Psychology*. BA, 1975, BS, Pennsylvania State University, 1975; MA, 1979, PhD, 1981, University of Connecticut

Allison, David J., *Associate Professor, School of Architecture*. BS, 1978, MArch, 1982, Clemson University

Alverson, David Roy, *Professor, Entomology, Soils, and Plant Sciences*. BS, 1968, MS, 1976, Clemson University; PhD, University of Georgia, 1979

Amirkhanian, Serji N., *Professor, Civil Engineering*. BS, 1979, MS, 1981, Tennessee Technological University; PhD, Clemson University, 1987

An, Yanming, *Assistant Professor, Languages*. BA, 1982, MA, 1985, Fudan University of Shanghai (China); PhD, University of Michigan, 1997

An, Yuchuei, *Adjunct Assistant Professor, Bioengineering*. MD, Harbin Medical University (China), 1983; MM, Beijing Medical University (China), 1986

Anand, Subhash C., *Professor, Civil Engineering*. BS, Banaras Hindu University (India), 1955; MS, 1965, PhD, 1968, Northwestern University; PE

Anderson, Denise Marie, *Assistant Professor, Parks, Recreation, and Tourism Management*. BA, Illinois Wesleyan University, 1992; MS, Eastern Illinois University, 1993; PhD, University of Illinois-Urbana-Champaign, 2000

Anderson, Paul Christopher, *Assistant Professor, History*. BA, University of North Carolina, 1990; MA, 1994, PhD, 1998, University of Mississippi

Andrew, John R., Jr., *Assistant Professor, History*. BA, University of North Carolina, 1987; MA, Clemson University, 1993; PhD, University of Georgia, 1997

Andrighetti, Kara R., *Visiting Instructor, Mathematical Sciences*. BS, 2000, MS, 2003, Clemson University

Andrus, Ronald D., *Assistant Professor, Civil Engineering*. BS, 1983, MS, 1986, Brigham Young University; PhD, University of Texas, 1994

Apostel, Kristi D., *Lecturer, English*. BA, Toccoa Falls College, 1998; MA, Clemson University, 2002

Appling, Jeffrey R., *Associate Professor, Chemistry*. BS, 1980, PhD, 1985, Georgia Institute of Technology

Arbena, Joseph L., *Professor, History*. AB, George Washington University, 1961; PhD, University of Virginia, 1970

Arya, Dev Priya, *Assistant Professor, Chemistry*. BS, University of Delhi (India), 1996; PhD, Northeastern University, 1996

Ashton, Susanna M., *Assistant Professor, English*. BA, Vassar College, 1989; MA, 1993, PhD, 1998, University of Iowa

Askew, George R., *Director, Belle W. Baruch Forest Science Institute; Professor, Forest Resources*. BS, 1976, MS, 1978, PhD, 1981, Clemson University

Aspland, J. Richard, *Professor, Materials Science and Engineering*. BS, 1958, MS, 1960, University of Leeds (England); PhD, Manchester University (England), 1964

Atkinson, George, Jr., *Visiting Associate Professor, Parks, Recreation, and Tourism Management; Counselor, Counseling Center*. BA, Rhodes College, 1982; MS, 1984, PhD, 1988, University of Memphis

Austin, Eric M., *Assistant Professor, Mechanical Engineering*. BS, 1980, MS, 1982, University of Illinois-Urbana-Champaign; PhD, Virginia Polytechnic Institute and State University, 1998

Aziz, Nadim M., *Department Chair and Professor, Civil Engineering*. BSCE, 1978, MS, 1980, PhD, 1984, University of Mississippi

Back, W. Edward, *Associate Professor, Civil Engineering*. BS, 1978, MS, 1986, University of Illinois; PhD, Clemson University, 1994

Backman, Kenneth E., *Associate Professor, Parks, Recreation, and Tourism Management*. BS, Acadia University (Canada), 1980; MUP, 1985, PhD, 1989, Texas A&M University

Backman, Sheila J., *Professor, Parks, Recreation, and Tourism Management*. BSC, 1977, MR, 1979, Acadia University (Canada); PhD, Texas A&M University, 1988

Baicu, Catalin E., *Adjunct Assistant Professor, Bioengineering*. MS, University Politehnica of Bucharest (Romania), 1987; PhD, Clemson University, 1996

Baier, Scott L., *Assistant Professor, Economics*. BS, 1988, MA, 1991, Bowling Green State University; PhD, Michigan State University, 1996

Bailey, Beatrice Naff, *Professor, Teacher Education*. BA, Longwood College, 1978; MA, Bethany Theological Seminary, 1981; EdD, Virginia Polytechnic Institute and State University, 1987

Bailey, Kevin M., *Adjunct Associate Professor, Chemical Engineering*. BS, University of Connecticut, 1978, MS, 1983, PhD, 1987, Rutgers University-Piscataway

Bainbridge, Robert W., *Director, South Carolina Design Arts Partnership; Lecturer, Planning and Landscape Architecture*. BA, University of California-Berkeley, 1970; MArch, Rice University, 1978

Baisd, William V., *Professor, Horticulture*. BS, Oregon State University, 1976; MA, Miami University, 1979; PhD, University of Virginia, 1983

Balakrishnan, Nagraj, *Professor, Management*. BE, University of Madras (India), 1981; MS, University of Kentucky, 1983; PhD, Purdue University, 1987

Balch, Clarence A., *Lecturer, General Engineering*. BS, California State Polytechnic University-Pomona, 1959

Ballard, Robert E., *Professor, Biological Sciences*. BS, 1966, MA, 1968, Miami University; PhD, University of Iowa, 1975

Ballato, John M., *Associate Professor, Materials Science and Engineering*. BS, 1993, MS, 1995, PhD, 1997, Rutgers University

Banks, Scott A., *Adjunct Assistant Professor, Bioengineering*. BS, 1985, MS, 1988, Case Western Reserve University; PhD, Massachusetts Institute of Technology, 1992

Barczewski, Stephanie L., *Acting Department Chair and Associate Professor, History*. BA, Columbia University, 1990; PhD, Yale University, 1996

Barcolet, Susan F., *Chief Operating Officer, Agricultural Experiment Station; Associate Dean and Program Director, Food Safety and Nutrition; Professor, Food Science and Human Nutrition*. BS, 1971, MS, 1979, PhD, 1985, North Carolina State University

Barfield, Rayford E., Jr., *Professor, English*. AB, LaGrange College, 1961; MA, University of Georgia, 1963; PhD, University of Tennessee, 1969

Bargerion, Jefferson D. III, *Adjunct Assistant Professor, Agricultural and Biological Engineering*. BS, North Georgia College and State University, 1969; MS, 1972, PhD, 1989, Clemson University

Barker, James E., *President, Professor, School of Architecture*. BA, Clemson University, 1970; MArch, Washington University, 1973; FAIA

Barkley, David L., *Professor, Applied Economics and Statistics*. BA, Furman University, 1969; MA, University of Georgia, 1972; PhD, Iowa State University, 1976

Barmore, Charles R., *Adjunct Professor, Food Science and Human Nutrition*. BS, Clemson University, 1966; MS, 1969, PhD, 1972, University of Florida

Barnes, Peter A., *Department Chair and Professor, Physics and Astronomy*. BA, 1963, MS, 1964, PhD, 1969, University of Waterloo (Canada)

Barnhardt, Kelley D., *Lecturer, English*. BA, University of North Carolina, 1988; MA, Appalachian State University, 2003

Barrett, David E., *Professor, Teacher Education*. BA, Wesleyan University, 1969; MS, 1973, PhD, 1974, University of Southern California

Barron, Felix H., *Professor, Food Science and Human Nutrition*. BS, University of Chihuahua (Mexico), 1972; MS, University of Rome (Italy), 1975; MS, Washington State University, 1982; PhD, Michigan State University, 1990

Basova, Yuliya V., *Research Associate/Assistant Professor, Center for Advanced Engineering Fibers and Films*. MS, Ukrainian National Technical University (Ukraine), 1988; PhD, Aichi Institute of Technology (Japan), 2000

Batemann, Ted A., *Assistant Professor, Bioengineering*. BA, DePaul University, 1992; MS, 1996, PhD, 1999, University of Colorado-Boulder

Batt, Heather P., *Assistant Professor, Packaging Science*. BA, Princeton University, 1995; PhD, Clemson University, 2001

- Battisto, Dina G.**, Assistant Professor, School of Architecture, BArch, University of Tennessee, 1991; MArch, Clemson University, 1993; MS, University of Michigan, 1996
- Bauer, Larry L.**, Professor, Applied Economics and Statistics, BS, University of Illinois, 1961; MS, Purdue University, 1963; PhD, North Carolina State University, 1968
- Bauer, Philip J.**, Adjunct Associate Professor, Entomology, Soils, and Plant Sciences, BS, 1979, BS, 1982, MS, 1985, University of Wisconsin; PhD, Texas A&M University, 1988
- Bauerle, William L.**, Assistant Professor, Horticulture, BS, Colorado State University, 1995; MS, University of Washington, 1997; PhD, Cornell University, 2001
- Baum, Carl W.**, Associate Professor, Electrical and Computer Engineering, BS, University of California, 1987; MS, 1989, PhD, 1992, University of Illinois
- Bausman, Dennis C.**, Assistant Professor, Construction Science and Management, BS, Iowa State University, 1971; MCM, Clemson University, 1995; PhD, Heriot-Watt University (Scotland), 2002
- Bautista, Gloria**, Professor, Languages, BA, Javeriana University (Colombia), 1970; BA, 1972, MA, 1975, MS, 1978, PhD, 1987, State University of New York-Albany
- Basa, Ernest G., Jr.**, Associate Professor, Electrical and Computer Engineering, BEE, University of Virginia, 1962; MSEE, 1968, PhD, 1970, Duke University
- Beachman, Jeffrey L.**, Adjunct Assistant Professor, Biological Sciences, BS, 1979, MS, 1983, Clemson University; PhD, State University of New York-Albany, 1988
- Beasley, Donald E.**, Professor, Mechanical Engineering, BS, 1978, MS, 1980, Clemson University; PhD, University of Michigan, 1983
- Becker, Robert H.**, Director, Strom Thurmond Institute; Professor, Parks, Recreation, and Tourism Management, BS, Pennsylvania State University, 1970; MA, 1973, PhD, 1976, University of Maryland
- Beckner, John C.**, Director, Language and International Trade Program; Professor, Languages, BA, Princeton University, 1965; Licence des Lettres, 1967, Doctorat d'université, 1969, University of Besançon (France)
- Belcher, Cynthia A.**, Assistant Professor, School of Nursing, BSN, University of Miami, 1969; MN, Emory University, 1971
- Bell, Lansford C., S. E.** Liles Distinguished Professor, Construction Engineering, BS, 1965, MS, 1968, University of Maryland; PhD, Vanderbilt University, 1972
- Bellinger, Robert G.**, Extension Associate/Associate Professor, Entomology, Soils, and Plant Sciences, BS, 1974, MS, 1979, University of Maryland; PhD, Virginia Polytechnic Institute and State University, 1985
- Benjamin, Daniel K.**, Professor, Economics, BA, University of Virginia, 1969; MA, 1971, PhD, 1975, University of California-Los Angeles
- Bennett, Alma**, Professor, English, BM, Belhaven College, 1962; MS, Radford University, 1974; PhD, University of Texas-Dallas, 1991
- Benson, Eric P.**, Professor, Entomology, Soils, and Plant Sciences, BS, University of Vermont, 1979; MS, Fairleigh Dickinson University, 1984; PhD, Clemson University, 1988
- Benson, Lisa C.**, Research Associate/Assistant Professor, Bioengineering, BS, University of Vermont, 1982; MS, 1986, PhD, 2002, Clemson University
- Bertrand, Jean A.**, Professor, Animal and Veterinary Sciences, BS, University of Missouri, 1980; MS, Iowa State University, 1983; PhD, University of Georgia, 1987
- Bertsch, Paul M.**, Adjunct Professor, School of the Environment, BS, University of Connecticut, 1978; MS, Virginia Polytechnic Institute and State University, 1980; PhD, University of Kentucky, 1983
- Bhaduri, Sarit B.**, George Bishop III Chair and Professor, School of Materials Science and Engineering, BS, 1974; MS, 1976, Indian Institute of Technology (India); PhD, State University of New York-Stony Brook, 1981
- Biggers, Sherrell B.**, Professor, Mechanical Engineering, BSCE, North Carolina State University, 1966; MS, 1970, PhD, 1971, Duke University
- Biggers, Sherry**, Lecturer, Mathematical Sciences, BS, Auburn University, 1968; MAT, Duke University, 1971; MS, University of Kentucky, 1973
- Billings, Andrew C.**, Assistant Professor, Communication Studies, BS, 1994, MA, 1996, PhD, 1999, Indiana University
- Birchfield, Stanley T.**, Assistant Professor, Electrical and Computer Engineering, BS, Clemson University, 1993; MS, 1996, PhD, 1999, Stanford University
- Birkenkott, Glenn P.**, Jr., Professor, Animal and Veterinary Sciences, BS, 1973, MS, 1975, PhD, 1978, University of Wisconsin
- Bishop, Carl O. III**, Lecturer, Communication Studies, BA, 1996, MA, 1997, Duquesne University
- Bixler, Robert D.**, Assistant Professor, Parks, Recreation, and Tourism Management, BA, 1981, MA, 1986, University of Louisville; PhD, Clemson University, 1994
- Blackbourn, Richard L.**, Department Chair and Professor, Leadership, Technology, and Counselor Education, BS, 1974, MS, 1976, EdD, 1983, Mississippi State University
- Blair, Dudley W.**, Director, MBA Program; Professor, Economics, BS, 1970, PhD, 1975, Texas A&M University
- Blake, James H.**, Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences, BS, Tennessee Technological University, 1982; MS, University of Arkansas, 1984
- Blob, Richard W.**, Assistant Professor, Biological Sciences, BA, University of Pennsylvania, 1992; SM, 1995, PhD, 1998, University of Chicago
- Bodenheimer, Lisa**, Associate Librarian, Cooper Library, BA, Mercer University, 1980; MAT, Vanderbilt University, 1983; MLS, Indiana University, 1986
- Bodine, Ashby B. II**, Department Chair and Professor, Animal and Veterinary Sciences, BA, 1969, MS, 1975, PhD, 1978, Clemson University
- Boland, Thomas**, Assistant Professor, Bioengineering, DEUGS, Université Paul Sabatier (France), 1987; Diplôme d'Ingenieur, École Nationale Supérieure d'Ingenieurs de Genie Chimique (France), 1990; PhD, University of Washington, 1995
- Bolt, Brian G.**, Lecturer, Animal and Veterinary Sciences, BS, Western Kentucky University, 1996; MS, Clemson University, 2003
- Boone, William R.**, Adjunct Professor, Animal and Veterinary Sciences; Director, Assisted Reproductive Technology and Andrology Laboratories, Greenville Hospital System, AS, Abraham Baldwin Agricultural College, 1968; BS, University of Georgia, 1970; MS, 1972, PhD, 1977, Clemson University
- Boring, Toby M.**, Lecturer, Applied Economics and Statistics, BS, 1977, MS, 1982, University of Tennessee
- Botchway, Portia A.**, Lecturer, School of Nursing, BSN, Hampton Institute, 1975; MSN, University of Maryland, 1979
- Boudreau, Mark**, Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences, BS, University of Illinois, 1980; MS, University of Wisconsin, 1986; PhD, Oregon State University, 1991
- Bowerman, William W. IV**, Assistant Professor, Forestry and Natural Resources, BS, Western Michigan University, 1985; MA, Northern Michigan University, 1991; PhD, Michigan State University, 1993
- Bowers, Peggy J.**, Assistant Professor, Communication Studies, BS, 1984, MA, 1989, Wichita State University; PhD, Stanford University, 1998
- Bowker, James M.**, Adjunct Professor, Forestry and Natural Resources, BA, Bates College, 1976; PhD, Texas A&M University, 1987
- Bowman, Larry S.**, Adjunct Professor, Bioengineering, BA, West Virginia University, 1969; MS, Clemson University, 1971; MD, Medical University of South Carolina, 1974
- Boykin, Joseph E., Jr.**, Dean of Libraries, BS, 1962, MS, 1965, Florida State University
- Bradley, Daniel J.**, Assistant Professor, Finance, BA, 1996, MBA, 1997, University of Central Florida; PhD, University of Kentucky, 2001
- Bradshaw, David W.**, Professor, Horticulture, BS, 1968, MS, 1973, North Carolina State University; PhD, Virginia Polytechnic Institute and State University, 1977
- Brainerd, Edwin G., Jr.**, Associate Professor, Psychology, BA, Washington College, 1968; MA, 1971, PhD, 1974, West Virginia University
- Brame, Scott E.**, Research Associate/Assistant Professor, School of the Environment, BS, New Mexico Institute of Mining and Technology, 1983; MS, Clemson University, 1993
- Brannan, James R.**, Professor, Mathematical Sciences, BS, 1973, MS, 1976, Utah State University, PhD, Rensselaer Polytechnic Institute, 1979
- Brant, William A.**, Associate Professor, Languages, BA, Columbia International University, 1976; MEd, 1978, EdD, 1986, University of South Carolina
- Brawley, Joel V., Jr.**, Alumni Professor, Mathematical Sciences, BS, 1960, MS, 1962, PhD, 1964, North Carolina State University
- Brewer, William E.**, Lecturer, Livestock and Poultry Health, BS, North Carolina State University, 1987; PhD, University of South Carolina, 1991
- Bridges, William C., Jr.**, Professor, Applied Economics and Statistics, BS, University of North Carolina, 1980; MS, 1982, PhD, 1984, University of Nebraska
- Bridgwood, Joan**, Lecturer, Languages, BA, University of Leeds (England), 1967; MA, Middlebury College, 1989
- Bridgwood, Michael A.**, Associate Professor, Electrical and Computer Engineering, BSc, University of Leeds (England), 1968; MSc, 1975, PhD, 1979, Portsmouth Polytechnic Institute
- Brigmon, Robin L.**, Adjunct Assistant Professor, School of the Environment, BS, 1979, MS, 1987, PhD, 1992, University of Florida
- Britt, Thomas W., Jr.**, Assistant Professor, Psychology, BA, College of William and Mary, 1988; MA, Wake Forest University, 1990; PhD, University of Florida, 1994
- Bronikowski, Michael G.**, Adjunct Assistant Professor, School of the Environment, BS, Marquette University, 1984; PhD, Purdue University, 1994
- Brooke, James N.**, Adjunct Professor, School of the Environment, BS, New Mexico Institute of Mining and Technology, 1961; PhD, Imperial College of Science and Technology, 1969
- Brookover, Robert S. IV**, Lecturer, Parks, Recreation, and Tourism Management, BS, 1993, MS, 1995, PhD, 2002, Clemson University
- Brooks, Andrew Scott**, Lecturer, Livestock and Poultry Health, BA, Queen's University-Kingston (Canada), 1992; DVM, 1996, PhD, 2003, University of Guelph (Canada)
- Brossan, Denis A.**, Director, Ceramic Center, Professor, Materials Science and Engineering, BS, 1967; MS, 1968, Clemson University; PhD, Iowa State University, 1972; PE
- Browdy, Craig L.**, Adjunct Professor, Forestry and Natural Resources, BA, 1980, BSc, 1981, University of Maryland; PhD, Tel Aviv University (Israel), 1989
- Brown, Lori Leigh**, Associate Professor, Leadership, Technology, and Counselor Education, BS, 1985, MA, 1988, EdS, 1993, Appalachian State University; PhD, University of North Carolina-Greensboro, 1995

- Brown, Philip J.**, Assistant Professor, Materials Science and Engineering. BS, 1987, PhD, 1991, University of Leeds (England)
- Brown, Russell H.**, Professor, Civil Engineering. BS, University of Houston, 1966; PhD, Rice University, 1970; PE
- Brown-Faust, James E.**, Assistant Professor, Horticulture. BS, Murray State College, 1986; MS, 1992, PhD, 1994, Michigan State University
- Bruce, David A.**, Associate Professor, Chemical Engineering. BS, 1991, MS, 1992, PhD, 1994, Georgia Institute of Technology
- Bruhns, Robert A.**, Lecturer, School of Architecture. BS, Clemson University, 1983; MArch, Georgia Institute of Technology, 1988
- Brumaghini, Julia**, Assistant Professor, Chemistry. AB, Harvard University, 1994; PhD, University of Illinois-Urbana-Champaign, 1999
- Brune, David E.**, Neuman Endowed Chair and Professor, Agricultural and Biological Engineering. BS, 1974, MS, 1975, PhD, 1978, University of Missouri
- Bryant, Hallam B.**, Professor, English. BA, Emory University, 1959; MA, University of North Carolina, 1962; PhD, Vanderbilt University, 1968
- Buford, Rhonda W.**, Assistant Professor, Teacher Education. BA, University of Mississippi, 1988; MEd, 1993, PhD, 1996, University of Southern Mississippi
- Bunnell, Kristin M.**, Lecturer, Mathematical Sciences. BS, Elon College, 1998; MS, Clemson University, 2000
- Burati, James L., Jr.**, Professor, Civil Engineering. BS, Virginia Polytechnic Institute and State University, 1974; MS, Ohio State University, 1975; PhD, Pennsylvania State University, 1984
- Burden, Jeffrey C.**, Director and Assistant Professor, Historic Preservation. BS, 1982, MArch, 1985, Georgia Institute of Technology; MA, 1992, PhD, 1999, University of California-Berkeley
- Burg, Karen J. L.**, Associate Professor, Bioengineering. BS, 1990, MS, 1992, North Carolina State University; PhD, Clemson University, 1996
- Burnett, G. Wesley**, Professor, Parks, Recreation, and Tourism Management. BA, Southern Methodist University, 1966; MSLS, Our Lady of the Lake University, 1970; MA, 1974, PhD, 1976, University of Oklahoma; FRGS
- Burnett, Karen G.**, Adjunct Assistant Professor, Biological Sciences. BS, College of William and Mary, 1972; PhD, University of California-San Diego, 1978
- Burns, Alan C.**, Associate Librarian, Cooper Library. BS, Weber State University, 1994; MLS, Indiana University-Bloomington, 1996; MA, Indiana University-Purdue University Indianapolis, 1996
- Burns, James M.**, Associate Professor, History. BA, University of California-Los Angeles, 1985; Graduate Diploma, University of Cambridge (England), 1986; MA, 1993, PhD, 1998, University of California-Santa Barbara
- Burns, James W.**, Adjunct Assistant Professor, Bioengineering. BS, Purdue University, 1977; MS, 1981, PhD, 1984, University of Illinois
- Burr, Stacy N.**, Lecturer, Teacher Education. BA, Furman University, 1993; MA, University of South Carolina-Spartanburg, 1996; PhD, University of South Carolina, 2001
- Burroughs, Jill K.**, Director, Small Business Development Center; Lecturer, Economics. BS/BA, Winthrop University, 1981; MSIM, Clemson University, 1991
- Burton, O'Neil B. III**, Associate Director, Cooperative Education Program; Lecturer, Teacher Education. BA, University of South Carolina, 1989; MA, 1991, PhD, 2000, Clemson University
- Busscher, Warren J.**, Adjunct Professor, Entomology, Soils, and Plant Sciences. BS, Loyola University, 1967; MS, 1970, PhD, 1976, Pennsylvania State University
- Butler, Chalmers M.**, Alumni Distinguished Professor. Electrical and Computer Engineering. BS, 1957, MS, 1959, Clemson University; PhD, University of Wisconsin, 1962
- Butler, David**, Assistant Professor, Aerospace Studies; Major U.S. Air Force. BS, University of North Carolina-Wilmington, 1981; MS, Air Force Institute of Technology, 1992
- Buyer, Paul L.**, Assistant Professor, Performing Arts. BS, Ball State University, 1992; MM, 1994, DMA, 1999, University of Arizona
- Byrne, Leonard R.**, Adjunct Lecturer, Packaging Science. BS, Providence College, 1966; MBA, Saint John's University, 1969
- Caban, Jose R.**, Director, School of Architecture; Professor, Planning and Landscape Architecture. BArch, Clemson University, 1967; MCD, University of Liverpool (England), 1971; AIA, APA
- Cadorette, Deborah Jo**, Lecturer, Teacher Education. BS, Towson University, 1973; MEd, University of Miami, 1989
- Caldwell, Judith D.**, Associate Professor, Horticulture; Adjunct Associate Professor, Forest Resources. BS, 1975, MS, 1977, Virginia Polytechnic Institute and State University; PhD, University of Arkansas, 1981
- Calkin, Neil J.**, Associate Professor, Mathematical Sciences. BA, 1984, MA, 1986, University of Cambridge (England); PhD, University of Waterloo (Canada), 1988
- Callahan, Mac A.**, Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences. BA, 1994, BS, 1994, MS, 1996, University of Georgia; PhD, Kansas State University, 2000
- Calvert, Wanda L.**, Lecturer, Teacher Education. BS, Charleston Southern University, 1989; MEd, The Citadel, 1995
- Calvez, Daniel J.**, Professor, Languages. Licence des Lettres, Université Catholique de L'Isère (France), 1965; PhD, University of Georgia, 1980
- Camberato, James J.**, Professor, Entomology, Soils, and Plant Sciences. BS, University of Massachusetts, 1980; MS, 1982, PhD, 1987, North Carolina State University
- Cameron, Albert Neill, Jr.**, Vice President, Advancement; Adjunct Professor, Marketing. BS, Georgia State University, 1972; MBA, Emory University, 1982
- Camp, Carl Rosser, Jr.**, Adjunct Professor, Agricultural and Biological Engineering. BS, 1958, MS, 1967, Auburn University; PhD, North Carolina State University, 1969
- Campbell, Becky F.**, Adjunct Assistant Professor, School of Nursing. BS, 1974, MS, 1977, Clemson University; PhD, University of South Carolina, 1990
- Campbell, Robert L.**, Professor, Psychology. BA, Harvard University, 1974; PhD, University of Texas, 1986
- Camper, Nyal D.**, Professor, Entomology, Soils, and Plant Sciences and Biological Sciences. BS, 1962, PhD, 1966, North Carolina State University
- Cantrell, R. Stephen**, Professor, Management. BS, University of Alabama, 1972; MS, University of Kentucky, 1974; PhD, North Carolina State University, 1982
- Cao, Weiguo**, Assistant Professor, Genetics, Biochemistry and Life Science Studies. BS, Wuhan University (China), 1983; PhD, University of Idaho, 1992
- Carlson, Leslie C.**, Professor, Marketing. BA, Midland Lutheran College, 1973; MA, 1980, PhD, 1985, University of Nebraska
- Carnier, Gerald R.**, Professor, Entomology, Soils, and Plant Sciences. BA, 1964, MS, 1966, PhD, 1969, Auburn University
- Carney, Elizabeth D.**, Professor, History. BA, Smith College, 1969; MA, 1973, PhD, 1975, Duke University
- Carr, Rebecca L.**, Assistant Professor, School of Nursing. BSN, 1977, MSN, 1983, PhD, 1977, Medical College of Georgia
- Carraway, Elizabeth R.**, Assistant Professor, School of the Environment. BS, 1981, PhD, 1989, University of Virginia
- Carter, George E., Jr.**, Associate Dean, Academic Services; Professor, Plant Pathology and Physiology. BS, 1968, MA, 1970, Wake Forest University; PhD, Clemson University, 1973
- Cash, L. Stephen**, Professor, School of Accountancy and Legal Studies. BS, 1963, JD, 1968, University of Tennessee; LL.M., Washington University, 1972; CPA
- Cason, Katherine L.**, Professor, Food Science and Human Nutrition. BS, Pennsylvania State University, 1982; MS, Texas Woman's University, 1985; PhD, Virginia Polytechnic Institute and State University, 1988
- Castle, James W.**, Associate Professor, School of the Environment. BS, Allegheny College, 1972; MS, University of Wisconsin, 1974; PhD, University of Illinois, 1978
- Caver, John A.**, Lecturer, Livestock and Poultry Health. DVM, Tuskegee University, 1977; MPH, University of South Carolina, 1994
- Cawood, Mark E.**, Lecturer, Mathematical Sciences. BS, Manchester College, 1987; MS, 1990, PhD, 1994, Clemson University
- Cawthon, Tony W.**, Associate Professor, Leadership, Technology, and Counselor Education. BA, 1981, MA, 1983, University of Tennessee; PhD, Mississippi State University, 1995
- Cephas, Carole B.**, Assistant Professor, Languages. BA, 1991, MA, 1992, University La Sorbonne (France); MA, 1996, PhD, 1999, Michigan State University
- Chamberlain, Frances F.**, Professor, Planning and Landscape Architecture. BA, University of Texas-Austin, 1970; MLA, University of Virginia, 1980
- Chapin, Jay W.**, Professor, Entomology, Soils, and Plant Sciences, Edisto Research and Education Center. BS, Dickinson College, 1970; MA, East Carolina University, 1975; PhD, Clemson University, 1978
- Chapman, Stephen R.**, Senior Contract Advisor, Office of Research; Professor, Entomology, Soils, and Plant Sciences. BS, 1959, MS, 1963, PhD, 1966, University of California; JD, University of Montana, 1991
- Chapman, Wayne K.**, Professor, English. BS, 1972, MA, 1977, Portland State University; PhD, Washington State University, 1988
- Charney, Mark J.**, Department Chair and Professor, English. BA, Clemson University, 1978; MA, University of New Orleans, 1980; PhD, Tulane University, 1987
- Chastain, John P.**, Associate Professor, Agricultural and Biological Engineering. BS, University of Georgia, 1982; MS, 1987, PhD, 1991, University of Kentucky; EIT
- Chen, Feng**, Assistant Professor, Food Science and Human Nutrition. BS, Shanghai Fisheries University (China), 1990; MS, Wuxi Institute of Light Industry (China), 1992; PhD, Louisiana State University, 1997
- Chen, Wen Y.**, Associate Professor, Biological Sciences. DDS, Shanghai Second Medical College (China), 1982; MS, 1987, PhD, 1991, Ohio University
- Cheng, Shu-Hua**, Adjunct Assistant Professor, Genetics, Biochemistry, and Life Science Studies. BS, 1981, MS, 1983, National Taiwan University (China); PhD, Washington State University, 1988
- Childress, Michael J.**, Lecturer, Biological Sciences. BS, University of Tampa, 1987; MA, University of California-Berkeley, 1990; PhD, Florida State University, 1995
- Cho, Byung-rae**, Associate Professor, Industrial Engineering. BS, Kyung Hee University (Korea), 1982; MS, Ohio State University, 1985; PhD, University of Oklahoma, 1994
- Christensen, Robert W.**, Adjunct Professor, Bioengineering. DDS, New York University, 1948
- Christoforou, Christos S.**, Assistant Professor, School of the Environment. BS, Rice University, 1988; MS, 1989, PhD, 1995, California Institute of Technology
- Christopher, Raymond A.**, Associate Professor, School of the Environment. BS, 1965, MS, 1967, University of Rhode Island; PhD, Louisiana State University, 1971

- Chumanov, George**, Assistant Professor, Chemistry. MS, Moscow Engineering-Physical Institute (Russia), 1982; PhD, Moscow State University (Russia), 1988
- Churan, J. Thomas**, Lecturer, Management. BS, University of Pittsburgh, 1965; MBA, California State University-Fresno, 1970
- Cicimurri, Christian Maloney**, Adjunct Lecturer, School of the Environment. BA, Rutgers University, 1993; MS, South Dakota School of Mines and Technology, 1999
- Clark, Lawrence S.**, Associate Professor, School of Accountancy and Legal Studies. BBA, Augusta College, 1968; MAcc, University of Georgia, 1970; CPA, CMA
- Clarke, David B.**, Assistant Professor, Civil Engineering. BS, 1979, MS, 1982, PhD, 1995, University of Tennessee
- Clarke, Richard L.**, Associate Professor, Management. BS, Hobart College, 1967; MS, Air Force Institute of Technology, 1974; PhD, University of Texas, 1988
- Clarke, Shima N.**, Assistant Professor, Construction Science and Management. BSCE, 1980, MS, 1985, PhD, 1997, University of Tennessee
- Clayhold, Jeffrey A.**, Assistant Professor, Physics and Astronomy. BS, California Institute of Technology, 1984; PhD, Princeton University, 1989
- Clayton, Donald D.**, Professor, Physics and Astronomy. BS, Southern Methodist University, 1956; PhD, California Institute of Technology, 1962
- Cleendenin, Charles W., Jr.**, Adjunct Assistant Professor, School of the Environment. BS, Southeast Missouri State University, 1971; MS, Montana College of Mineral Science and Technology, 1973; PhD, University of Witwatersrand (South Africa), 1989
- Clinton, Barton D.**, Adjunct Assistant Professor, Forestry and Natural Resources. BS, 1979, MS, 1989, University of Georgia
- Coates, John T.**, Research Associate/Associate Professor, School of the Environment. BS, Middle Tennessee State University, 1968; MS, 1981, PhD, 1984, Clemson University
- Cochrane, Gordon M.**, Associate Librarian, Cooper Library. BA, Hillsdale College, 1989; MLS, University of South Carolina, 1992
- Coggeshall, John M.**, Professor, Sociology. BA, 1975, MA, 1978, PhD, 1984, Southern Illinois University
- Cohen, Peter A.**, Adjunct Assistant Professor, Philosophy and Religion. BA, Springfield College, 1979; MA, 1981, PhD, 1992, Florida State University
- Colacino, James M.**, Associate Professor, Biological Sciences. BA, Saint John Fisher College, 1968; MA, 1970, PhD, 1973, State University of New York
- Coleman, Katherine Y.**, Adjunct Assistant Professor, Applied Economics and Statistics. BS, 1981, MS, 1983, Clemson University; PhD, Texas A&M University, 1989
- Collier, John A.**, Instructor, Agricultural and Biological Engineering. BA, Georgia Institute of Technology, 1970; MS, University of Georgia, 1972; PhD, Clemson University, 1978; FE
- Collins, Carol A.**, Lecturer, Performing Arts. BA, Eckerd College, 1975; MA, Eastern Michigan University, 1978; MFA, Yale University, 1985
- Collins, Donald Lynn**, Professor, Planning and Landscape Architecture. BLA, North Carolina State University, 1968; MLA, Harvard University, 1969; RLA
- Collins, Edward R., Jr.**, Associate Professor, Electrical and Computer Engineering. BS, North Carolina State University, 1984; PhD, Georgia Institute of Technology, 1989
- Collins, Julianne S.**, Adjunct Assistant Professor, Genetics, Biochemistry, and Life Science Studies. BS, California State Polytechnic University-Pomona, 1992; MS, Texas A&M University, 1994; PhD, University of Alabama-Birmingham, 2000
- Colthorpe, Christopher A.**, Assistant Librarian, Cooper Library. BA, 1973, MA, 1974, York University (Canada); MA, Western Carolina University, 1976, MLIS, University of South Carolina, 1999
- Comfort, Janice G.**, Associate Librarian, Cooper Library. BS, West Virginia University, 1981; MLS, University of Pittsburgh, 1991
- Condrasky, Margaret D.**, Assistant Professor, Food Science and Human Nutrition. BS, Pennsylvania State University, 1977; MS, Indiana University of Pennsylvania, 1983; EdD, Clemson University, 1993
- Connell, John W.**, Adjunct Assistant Professor, Chemistry. BS, 1982, PhD, 1986, Virginia Commonwealth University
- Conner, William H.**, Professor, Forestry and Natural Resources, Belle W. Baruch Forest Science Institute. BS, 1973, MS, 1975, Virginia Polytechnic Institute and State University; PhD, Louisiana State University, 1988
- Connor, Kevin D.**, Assistant Librarian, Cooper Library. BS, Indiana University, 1991; MBA, Michigan State University, 1994; MLIS, University of Kentucky, 2001
- Connor-Greene, Patricia A.**, Alumni Professor, Psychology. BA, Wells College, 1976; PhD, University of South Carolina, 1983
- Conrad, Leslie E.**, Lecturer, Parks, Recreation, and Tourism Management. BS, Appalachian State University, 1991; MA, Clemson University, 1994
- Conway, Nancy J.**, Lecturer, Mathematical Sciences. BS, 1990, MS, 1999, Ohio State University
- Cooskey, Kay D.**, Associate Professor, Packaging Science. BS, Purdue University, 1984; MS, Indiana State University, 1985; PhD, University of Illinois, 1992
- Cooskey, Robert C.**, Adjunct Professor, Packaging Science. BS, 1957, MA, 1962, Ball State University; EdD, University of Maryland, 1973
- Cooper, C. Camille**, Assistant Librarian, Cooper Library. BA, Davidson College, 1989; MA, University of Georgia, 1992; MLIS, University of Texas-Austin, 1997
- Cooper, George IV**, Adjunct Professor, Bioengineering. BA, Williams College, 1964; MD, Cornell University Medical Campus, 1968
- Cooper, Melanie M.**, Alumni Professor, Chemistry. BS, 1975, MS, 1976, PhD, 1978, Manchester University (England)
- Corley, Gregg R.**, Associate Professor, Construction Science and Management. BS, 1983, MS, 1985, Clemson University
- Corrales, Norma**, Assistant Professor, Languages. BA, Universidad Pontificia Bolivariana (Colombia), 1977; MA, Instituto Caro y Cuervo, Seminario Andres Bello (Colombia), 1985; PhD, Ohio University, 1988
- Costa, Ralph**, Adjunct Assistant Professor, Forestry and Natural Resources. BS, 1973, MS, 1976, University of Arizona
- Costa, Xavier**, Adjunct Professor, School of Architecture. BA, Universitat Politècnica de Catalunya, 1984; MS, 1988, PhD, 1990, University of Pennsylvania
- Costello, Gerald E.**, Department Chair and Associate Professor, Public Health Sciences. BS, Wake Forest University, 1967; MAEd, East Carolina University, 1968; EdD, Temple University, 1974
- Couillard, Mary G.**, Associate Professor, School of Nursing. BS, 1966, MS, 1976, Wayne State University; PhD, University of Rochester, 1989
- Cover, Peggy H.**, Librarian and Head of Reference Unit, Cooper Library. BA, Blue Mountain College, 1962; MS, University of Illinois, 1965
- Cowden, Ashley S.**, Lecturer, English. BS, 2000, MA, 2003, Clemson University
- Cox, Christopher L.**, Associate Professor, Mathematical Sciences. BS, Grove City College, 1978; MS, 1980, PhD, 1984, Carnegie Mellon University
- Cox, Kern T.**, Lecturer, Graphic Communications. BS, 1997, MEd, 1999, Clemson University
- Cox, Richard**, Adjunct Assistant Professor, Applied Economics and Statistics. BS, Clemson University, 1974, JD, University of South Carolina, 1977
- Craig, Janet B.**, Assistant Professor, School of Nursing. BSN, 1964, MSN, 1966, Duke University, MBA, Georgia State University, 1997; PhD, Medical University of South Carolina, 2002
- Craig, Lynn G.**, Professor, School of Architecture. BArch, Clemson University, 1967, MArch, Washington University, 1969; AIA, RIBA, AFAA
- Craig, Startlet R.**, Director, Outreach and Enrichment. Lecturer, Sociology. BA, Spelman College, 1969; MSS, Bryn Mawr College, 1971
- Craeger, Karen A.**, Lecturer, Chemistry. BSE, University of Michigan, 1983; PhD, University of North Carolina, 1989
- Craeger, Stephen E.**, Professor, Chemistry. BS, Rensselaer Polytechnic Institute, 1982; PhD, University of North Carolina, 1987
- Crew, Linda J.**, Director, Joseph F. Sullivan Center, Lecturer, School of Nursing. BSN, Jacksonville State University, 1981; MBA, Clemson University, 1991
- Crino, Michael D.**, Alumni Professor, Management. BA, State University of New York-Geneva, 1969; MA, Northern Illinois University, 1971, MS, University of Arkansas, 1973; PhD, University of Florida, 1978
- Crooks, William J. III**, Adjunct Assistant Professor, School of the Environment. BS, University of North Carolina, 1985; MS, 1987, PhD, 1995, Florida State University
- Cross, James E.**, Librarian, Cooper Library. BA, Cleveland State University, 1979; MA, MLS, Case Western Reserve University, 1982
- Cross, Sydney A.**, Professor, Art. BFA, Northern Arizona University, 1977; MFA, Arizona State University, 1980
- Crosston, Matthew D.**, Assistant Professor, Political Science. BA, Colgate University, 1993; MA, University of London (England), 1994; PhD, Brown University, 2003
- Csernak, Stephen E.**, Lecturer, Civil Engineering. BS, 1974, MS, 1976, Clemson University
- Cuddy, Brian G.**, Adjunct Associate Professor, Bioengineering. BS, State University of New York-Albany, 1981; MS, 1983, MD, 1987, Albany Medical College
- Culin, Joseph D.**, Department Chair and Professor, Entomology, Soils, and Plant Sciences. BA, Eastern College, 1975; MS, University of Delaware, 1977; PhD, University of Kentucky, 1981
- Cumbest, Randolph J.**, Adjunct Assistant Professor, School of the Environment. BS, Auburn University, 1979; MS, University of Georgia, 1987; PhD, Virginia Polytechnic Institute and State University, 1988
- Cummings, John R.**, Lecturer, Genetics, Biochemistry, and Life Science Studies. BS, 1983, MS, 1988, Bowling Green State University
- Cunningham, Miller G.**, Associate Professor, Planning and Landscape Architecture. BA, Duke University, 1979; MA, University of South Carolina, 1985; PhD, Clemson University, 1995
- Currie, Heather B.**, Assistant Professor, Performing Arts. BA, Southern Illinois University, 1993; MFA, University of Nebraska, 1998
- Curtis, Charles E., Jr.**, Professor, Applied Economics and Statistics. BS, 1977, MS, 1979, University of Georgia; PhD, University of Nebraska, 1985
- Danehower, David A.**, Adjunct Associate Professor, Entomology, Soils, and Plant Sciences. BA, Erskine College, 1974; PhD, North Carolina State University, 1982
- Dargan, Mary Palmer**, Visiting Assistant Professor, Planning and Landscape Architecture. BS, University of Tennessee, 1976; M.L.A., Louisiana State University, 1981

- Darroudi, Taghi**, *Research Associate/Assistant Professor, Electron Microscope Facility*. BS, Texas Western University, 1965; BS, 1967, MS, 1968, University of Texas-El Paso; MS, University of California-Berkeley, 1980; PhD, Pennsylvania State University, 1982
- Davidson, Randy E.**, *Lecturer, Mathematical Sciences*. BS, Tulane University, 1976; MS, Lehigh University, 1978
- Davies, Kerry N.**, *Lecturer, Genetics, Biochemistry, and Life Science Studies*. BS, 1998, MS, 2002, Florida State University
- Davis, Jeanine M.**, *Adjunct Professor, Horticulture*. BS, Delaware Valley College, 1980; MS, Washington State University, 1983; PhD, North Carolina State University, 1987
- Davis, John S.**, *Professor, Management*. BS, United States Military Academy, 1965; MS, University of Southern California, 1972; MS, Boston University, 1979; PhD, Georgia Institute of Technology, 1984
- Davis, Martin A.**, *Professor, School of Architecture*. BArch, University of Oklahoma, 1971; MPhil, University of Edinburgh (Scotland), 1974; AIA
- Davis, Patricia S.**, *Lecturer, English*. BS, 1981, MEd, 1985, Georgia State University; MA, Middlebury College, 1996; PhD, Clemson University, 2002
- Davis, Roy B.**, *Adjunct Professor, Bioengineering*. BS, 1977, MS, 1979, PhD, 1983, Virginia Polytechnic Institute and State University
- Davis, Timothy A.**, *Assistant Professor, Computer Science*. BS, College of William and Mary, 1987; MCS, University of Virginia, 1989; PhD, North Carolina State University, 1998
- Davits, Todd D.**, *Assistant Professor, Applied Economics and Statistics*. BS, Iowa State University, 1994; MS, 1997, PhD, 2001, Purdue University
- Davis, W. Jeffrey**, *Adjunct Assistant Professor, Civil Engineering*. BS, University of Alabama, 1981; MS, Auburn University, 1987; PhD, Georgia Institute of Technology, 1997
- Daw, Murray S.**, *Professor, Physics and Astronomy*. BS, University of Florida, 1976; PhD, California Institute of Technology, 1981
- Dawson, Darren M.**, *McQueen Quattlebaum Professor, Electrical and Computer Engineering*. BSEE, 1984, PhD, 1990, Georgia Institute of Technology
- Dawson, Paul L.**, *Professor, Food Science and Human Nutrition*. BS, Salisbury State University, 1979; MS, University of Florida, 1986; PhD, North Carolina State University, 1989
- Dean, Ralph A.**, *Adjunct Associate Professor, Entomology, Soils, and Plant Sciences*. BS, University of London (England), 1980; PhD, University of Kentucky, 1986
- Dearing, Perino M., Jr.**, *Professor, Mathematical Sciences*. BS, 1963, MA, 1965, University of North Carolina; ME, 1971, PhD, 1972, University of Florida
- DeLulio, Edward**, *Professor, Aerospace Studies; Colonel U.S. Air Force*. BS, 1975, MS, 1976, Georgia Institute of Technology
- Del Real, Patricio**, *Assistant Professor, School of Architecture*. BA, Washington University, 1988; MArch, Harvard University, 1992
- Delicio, Gail C.**, *Associate Professor, Teacher Education*. BA, 1972, BS, 1973, Southern Illinois University; MEd, Stetson University, 1983; PhD, Florida State University, 1989
- Denham, Bryan E.**, *Charlie Campbell Associate Professor, Communication Studies*. BA, Indiana University, 1989; MA, California State University, 1993; PhD, University of Tennessee, 1996
- Desmarteau, Darryl D.**, *Tobey-Beaudrot Professor, Chemistry*. BS, Washington State University, 1963; PhD, University of Washington, 1966
- Detrich, David M.**, *Associate Professor, Art*. BFA, Kansas City Art Institute, 1980; MFA, Alfred University, 1982
- Devol, Timothy A.**, *Associate Professor, School of the Environment*. BS, Ohio State University, 1987; MS, 1988, PhD, 1993, University of Michigan
- Dewberry, Raymond A.**, *Adjunct Professor, School of the Environment*. BS, Virginia Polytechnic Institute and State University, 1974; PhD, Florida State University, 1980
- Dickens, E. David**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BA, Furman University, 1980; BS, University of Georgia, 1985; MS, 1988, PhD, 1997, Clemson University
- Dickens, Thomas L.**, *Professor, School of Accountancy and Legal Studies*. BA, University of Richmond, 1968; MBA, Virginia Commonwealth University, 1977; PhD, Texas A&M University, 1983; CPA
- Dickey, Jean L.**, *Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Kent State University, 1972; PhD, Purdue University, 1982
- Dickey, Kathy E.**, *Lecturer, School of Nursing*. BSN, 1987, MSN, 1989, Medical University of South Carolina
- Dieter, R. Karl**, *Professor, Chemistry*. BS, Lehigh University, 1973; PhD, University of Pennsylvania, 1981
- Dills, Angela K.**, *Assistant Professor, Economics*. BA, University of Virginia, 1996; MA, 2000, PhD, 2002, Boston University
- Dimond, Thomas W.**, *Professor, Art*. BFA, Massachusetts College of Art, 1966; MFA, University of Tennessee, 1969
- Dobbins, Thomas R.**, *Associate Professor, Agricultural and Biological Engineering*. BS, 1982, MAG, 1988, Clemson University; PhD, Virginia Polytechnic Institute and State University, 1999
- Dodd, Roy B.**, *Professor, Agricultural and Biological Engineering*. BS, 1968, MS, 1977, University of Georgia; PhD, Clemson University, 1983; PE
- Doerr, Marvin L.**, *Visiting Assistant Professor, Chemistry*. AB, Washington University, 1961; PhD, Georgia Institute of Technology, 1967
- Dooley, R. Larry**, *Associate Dean, College of Engineering and Science; Professor, Bioengineering*. BS, Virginia Polytechnic Institute and State University, 1968; MS, 1973, PhD, 1976, Clemson University
- Doost, Roger K.**, *Professor, School of Accountancy and Legal Studies*. BBA, University of Georgia, 1975; MBA, Industrial Management Institute (Iran), 1973; MAcc, 1984, DPA, 1984, University of Georgia; CPA, CMA, GPS
- Dorsch, Michael J.**, *Associate Professor, Marketing*. BS, University of Wisconsin-La Crosse, 1978; MBA, Arizona State University, 1980; PhD, University of Arkansas, 1987
- Doty, Wells B.**, *Visiting Assistant Professor, Leadership, Technology, and Counselor Education*. BS, United States Naval Academy, 1962; MS, Naval Postgraduate School, 1971; EdD, Clemson University, 1999
- Dougan, William R.**, *Department Chair and Professor, Economics*. BA, University of Virginia, 1971; MA, 1976, PhD, 1981, University of Chicago
- Douglas, Thomas J.**, *Assistant Professor, Management*. BS, Saint Louis University, 1968; MBA, Southern Illinois University-Edwardsville, 1977; PhD, University of Tennessee, 1997
- Doyle, Thomas W.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, Northeast Louisiana University, 1976; MSC, 1980, PhD, 1983, University of Tennessee
- Drake, Thomas L.**, *Professor, Electrical and Computer Engineering*. BS, Tri-State University, 1958; MS, 1959, PhD, 1964, Michigan State University
- Drane, Daniel D.**, *Assistant Professor, Parks, Recreation, and Tourism Management*. BS, 1988, MS, 1998, PhD, 2001, University of Southern Mississippi
- Drapcho, Caye Marie**, *Associate Professor, Agricultural and Biological Engineering*. BS, 1982, MS, 1986, Pennsylvania State University; PhD, Clemson University, 1993
- Draper, Pamela A.**, *Associate Librarian, Cooper Library*. BA, 1973, MA, 1976, Texas Technical University; PhD, 1987, MA, 1989, University of Missouri
- Drews, Michael J., J. E. Sirrine Professor, Materials Science and Engineering. BS, University of Wisconsin, 1967; PhD, North Texas State University, 1971**
- Dubsky, Richard Steven**, *Lecturer, Applied Economics and Statistics*. BS, Salisbury State University, 1975; MA, University of Tennessee, 1977; PhD, Duquesne University, 1989
- Duchowski, Andrew T.**, *Associate Professor, Computer Science*. BS, Simon Fraser University (Canada), 1990; PhD, Texas A&M University, 1997
- Dufault, Robert J.**, *Professor, Horticulture, Coastal Research and Education Center*. BS, Norwich University, 1976; MS, University of Vermont, 1978; PhD, Kansas State University, 1982
- Duke, Charles R.**, *Professor, Marketing*. BSME, Louisiana Technical University, 1970; MBA, Oklahoma City University, 1976; PhD, University of Texas-Arlington, 1988
- Duke, Martha J.**, *Lecturer, MBA Program*. BS, University of Kansas, 1970; MS, State University of New York, 1972
- Dull, Richard B.**, *Assistant Professor, School of Accountancy and Legal Studies*. BBA, 1980, BS, 1980, Harding University; MBA, University of North Carolina-Greensboro, 1982; PhD, Virginia Polytechnic Institute and State University, 1997; CPA
- Dunlap, Nancy C.**, *Lecturer, Eugene T. Moore School of Education*. BA, 1970, MA, 1975, PhD, 1977, University of South Carolina
- Dunn, B. Allen**, *Associate Dean, College of Agriculture, Forestry, and Life Sciences; Professor, Forest Resources*. BSE, 1965, ME, 1968, PhD, 1971, University of Georgia
- Dunston, Pamela J.**, *Associate Professor, Teacher Education*. BS, 1974, MA, 1978, Ball State University; PhD, University of Georgia, 1993
- Dutcher, Teresa L.**, *Assistant Professor, Aerospace Studies*. Captain U.S. Air Force. BA, Columbia College, 1996; MS, Webster University, 2003
- Dye, Cheryl Jo**, *Associate Professor, Public Health Sciences*. BSE, 1971, MA, 1981, Northeast Missouri State University; PhD, University of South Carolina, 1991
- Dzuris, Linda**, *Assistant Professor, Performing Arts; University Carillonner*. BM, 1992, MM, 1993, DMA, 1998, University of Michigan
- Echegoven, Lourdes E.**, *Lecturer, Chemistry*. BS, 1982, PhD, 1990, University of Miami
- Echegoven, Luis A.**, *Department Chair and Professor, Chemistry*. BS, 1971, PhD, 1974, University of Puerto Rico
- Edge, Benjamin E. III**, *Lecturer, Entomology, Soils, and Plant Sciences*. BS, 1979, MS, 1982, Clemson University; PhD, Purdue University, 1989
- Edge, Sandy**, *Director, College of Business and Behavioral Science Undergraduate Advising Center*. BS, Clemson University, 1972; MS, Troy State University, 1980
- Edie, Danny D.**, *Dow Professor, Chemical Engineering*. BS, Ohio University, 1965; MSES, University of Toledo, 1969; PhD, University of Virginia, 1972
- Edlin, Saul**, *Adjunct Professor, Graphic Communications*. BS, City College of New York, 1976; MS, City University of New York-Brooklyn College, 1964
- Edmondson, Elizabeth W.**, *Lecturer, Teacher Education*. BS, Duke University, 1980; MA, 1983, MS, 1988, University of North Carolina
- Edwards, Frances L.**, *Associate Professor, School of Accountancy and Legal Studies*. BA, Graceland University, 1972; JD, University of Kansas, 1980
- Egan, Clifton S. M.**, *Alumni Distinguished Professor, Theatre and Performing Arts*. BA, Hanover College, 1973; MFA, Northwestern University, 1976
- Eggert, Julia A.**, *Assistant Professor, School of Nursing*. BSN, University of Kansas, 1972; MN, Wichita State University, 1981; PhD, Clemson University, 1997

- Edison, Gene W.**, *Adjunct Assistant Professor, Biological Sciences*. BS, University of South Carolina, 1972; MS, 1975, PhD, 1990, Clemson University
- Eisminger, Sterling K.**, *Professor, English*. BS, 1967, MA, 1968, Auburn University; PhD, University of South Carolina, 1974
- Elliott, Ralph Delano**, *Associate Dean, Off-Campus, Distance, and Continuing Education; Professor, Economics*. BS, 1967, MS, 1968, PhD, 1972, North Carolina State University
- Ellis, Steven E.**, *Assistant Professor, Animal and Veterinary Sciences*. BSc, University of Connecticut, 1992; MSc, 1994, PhD, 1998, Virginia Polytechnic Institute and State University
- Ellison, Michael S.**, *Professor, Materials Science and Engineering*. BS, 1971, MA, 1973, PhD, 1983, University of California
- Elzerman, Alan W.**, *Director, School of the Environment*. BA, Williams College, 1971; PhD, University of Wisconsin, 1976
- Emert, Randall A.**, *Lecturer, General Engineering*. BS, 1989, MS, 1993, Western Illinois University
- English, William Rockford**, *Associate Professor, Forestry and Natural Resources*. BS, Oregon State University, 1980; MS, University of Missouri-Columbia, 1983; PhD, Clemson University, 1991
- Epiloto, George V.**, *Lecturer, School of Architecture*. BS, 1984, BArch, 1985, Rensselaer Polytechnic Institute; MArch, Southern California Institute of Architecture, 1993
- Erdman, Jori A.**, *Assistant Professor, School of Architecture*. BS, University of Virginia, 1989; MArch, Columbia University, 1995
- Ervin, Vincent J.**, *Professor, Mathematical Sciences*. BSc, Royal Melbourne Institute of Technology (Australia), 1978; MS, 1981, MS, 1983, PhD, 1984, Georgia Institute of Technology
- Esbridge, W. Frank, Sr.**, *Director, Construction Industry Cooperative Alliance; Lecturer, Civil Engineering*. BS, Clemson University, 1960; PE
- Espey, Molly**, *Associate Professor, Applied Economics and Statistics*. BS, 1988, MS, 1989, PhD, 1994, University of California-Davis
- Eubanks, Francis M.**, *Professor, Construction Science and Management*. BS, 1967, MS, 1968, Georgia Institute of Technology
- Eubanks, Lucy T.**, *Lecturer, Chemistry*. BA, Mount Holyoke College, 1960; MS, Seattle University, 1967
- Evanciew, Cheryl E.**, *Assistant Professor, Leadership, Technology, and Counselor Education*. BS, 1981, MEd, 1983, Clemson University; EdD, University of Georgia, 1995
- Evans, Patricia A.**, *Lecturer, Animal and Veterinary Sciences*. BS, 1991, MS, 1996, North Carolina State University; EdD, Clemson University, 2003
- Evatt, Helyn E.**, *Lecturer, English*. BA, 1994, MA, 1997, Clemson University
- Everman, David B.**, *Adjunct Assistant Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Wake Forest University, 1989; MEd, Emory University, 1993
- Eversole, Arnold G.**, *Professor, Forestry and Natural Resources*. BS, 1963, MS, 1969, PhD, 1974, Syracuse University
- Fadel, Georges M.**, *Professor, Mechanical Engineering*. Diploma, Swiss Federal Institute of Technology (Switzerland), 1976; MSc, 1978, PhD, 1988, Georgia Institute of Technology
- Fairbairn, Donald M.**, *Visiting Associate Professor, Mathematical Sciences*. BS, 1963, MA, 1968, PhD, 1975, Vanderbilt University
- Falta, Ronald W., Jr.**, *Professor, School of the Environment*. BS, 1982, MS, 1984, Auburn University; PhD, University of California, 1990
- Farnham, Mark William**, *Adjunct Professor, Horticulture*. BS, Ohio State University, 1977; MS, North Carolina State University, 1984; PhD, University of Minnesota, 1988
- Farris, John T.**, *Associate Professor, Planning and Landscape Architecture*. BA, Saint Louis University, 1972; MUI, 1974; PhD, 1996, Michigan State University; AICP
- Federico, Lienne C.**, *Assistant Professor, Teacher Education*. BA, Hamilton College, 1981; MA, University of North Carolina, 1982; PhD, East Carolina University, 1996
- Feeser, Andrea V.**, *Associate Professor, Art*. BA, Williams College, 1984; MPhil, 1992, PhD, 1996, City University of New York
- Feger, Christopher R.**, *Adjunct Assistant Professor, Chemistry*. BS, Massachusetts Institute of Technology, 1991; PhD, Ohio State University, 1996
- Felder, Frankie O.**, *Associate Dean, Graduate School; Assistant Professor, Curriculum and Instruction*. BS, Virginia Commonwealth University, 1972; MEd, University of Vermont, 1974; MEd, 1984, EdD, 1986, Harvard University
- Fennell, Robert E.**, *Professor, Mathematical Sciences*. BA, Bradley University, 1964; MS, 1966, PhD, 1969, University of Iowa
- Ferrell, J. Lee**, *BMW Lecturer, Languages*. BS, University of South Carolina-Spartanburg, 1986; MA, University of South Carolina, 2000
- Ferrell, Kathy E.**, *Lecturer, Genetics, Biochemistry, and Life Science Studies*. BA, 1993; MEd, 2000, Converse College
- Ferrell, William G., Jr.**, *Associate Professor, Industrial Engineering*. BA, Wake Forest University, 1977; MS, Virginia Polytechnic Institute and State University, 1979; PhD, North Carolina State University, 1989; PE
- Fery, Richard L.**, *Adjunct Professor, Horticulture, U.S. Vegetable Laboratory*. BS, Oregon State University, 1966; PhD, Purdue University, 1970
- Figliola, Richard S.**, *Professor, Mechanical Engineering*. BS, 1974, MS, 1976, PhD, 1979, University of Notre Dame; PE
- Fish, Robin Edwards**, *Lecturer, Teacher Education*. BA, 1995; MEd, 2000, Clemson University
- Fishman, Teresa Anne**, *Assistant Professor, English*. BS, Auburn University, 1992; MA, 1995, MA, 1996, Clemson University; PhD, Purdue University, 2002
- Fisk, William R.**, *Department Chair and Professor, Teacher Education*. BS, 1973, MS, 1976, PhD, 1979, Florida State University
- Fjeld, Robert A., Jerry E. and Harriet Calvert Dempsey**, *Professor, Waste Management*. BS, North Carolina State University, 1970; MS, 1973, PhD, 1976, Pennsylvania State University; PE
- Flanigan, Jackson L.**, *Professor, Leadership, Technology, and Counselor Education*. BA, Salem College, 1959; MA, West Virginia University, 1964; EdD, Virginia Polytechnic Institute and State University, 1986
- Flanigan, Sally K.**, *Adjunct Instructor, School of Nursing*. BS, Salem State College, 1978; MS, University of Virginia, 1990
- Flatt, Janice M.**, *Lecturer, Mathematical Sciences*. BS, 1979, MS, 1981, Clemson University
- Flinchum, Tamara R.**, *Lecturer, English*. BA, Central Wesleyan College, 1984; MA, Ball State University, 1986
- Flower, Phillip J.**, *Associate Professor, Physics and Astronomy*. BS, University of Toledo, 1970; PhD, University of Washington, 1976
- Foltz, Jeffrey W.**, *Professor, Forestry and Natural Resources*. BS, Ohio State University, 1972; MS, University of Wisconsin, 1974; PhD, University of Colorado, 1978
- Forkner, Cheryl B.W.**, *Assistant Professor, Leadership, Technology, and Counselor Education*. BS, DuPaul University, 1982; MEd, 1995, PhD, 2000, University of Georgia
- Fortnum, Bruce A.**, *Professor, Entomology, Soils, and Plant Sciences, Pee Dee Research and Education Center*. BA, La Salle University, 1973; MS, University of Delaware, 1975; PhD, Clemson University, 1978
- Foulger, Stephen H.**, *Associate Professor, Material Science and Engineering*. BS, University of California-Santa Barbara, 1990; PhD, Massachusetts Institute of Technology, 1996
- Foulk, John A.**, *Adjunct Assistant Professor, Applied Economics and Statistics*. BS, 1992, MS, 1994, PhD, 1998, Clemson University
- Fox, Richard S.**, *Adjunct Professor, Biological Sciences*. PhD, University of North Carolina, 1980
- Fraedrich, Bruce Robert**, *Adjunct Associate Professor, Forestry and Natural Resources*. BA, Newberry College, 1974; MEd, Duke University, 1976; PhD, Clemson University, 1979
- Fralix, Brandon D.**, *Lecturer, English*. BA, Presbyterian College, 2001; MA, Clemson University, 2003
- Fravel, Philip M.**, *Lecturer, Agricultural and Biological Engineering*. BS, 1981, MS, 1997, Virginia Polytechnic Institute and State University
- Fredendall, Lawrence D.**, *Associate Professor, Management*. BS, Central Michigan University, 1972; MBA, 1986, PhD, 1990, Michigan State University
- Frederick, James R.**, *Professor, Entomology, Soils, and Plant Sciences*. BS, 1981, MS, 1983, Pennsylvania State University; PhD, University of Illinois, 1987
- Freedman, David L.**, *Associate Professor, School of the Environment*. BS, University of Wisconsin, 1978; MS, University of Cincinnati, 1985; PhD, Cornell University, 1990
- Friedlob, George T.**, *Professor, School of Accountancy and Legal Studies*. BA, Vanderbilt University, 1963; MBA, University of Louisville, 1972; PhD, University of Mississippi, 1981; CMA, CPA
- Friedman, Harold L.**, *Adjunct Professor, Bioengineering*. BS, Hobart College, 1967; PhD, 1972, MEd, 1974, University of Virginia
- Frugoli, Julia**, *Assistant Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Gordon College, 1988; PhD, Dartmouth College, 1998
- Fullerton, Susan King**, *Associate Professor, Teacher Education*. BS, 1977, MEd, 1984, University of North Carolina-Greensboro; PhD, University of Maryland, 1991
- Fulton, Linda K.**, *Clinical Veterinarian, Research Services, Lecturer, Animal and Veterinary Sciences*. BA, 1975, MS, 1978, University of Southern Mississippi; DVM, Mississippi State University, 1989
- Futral, Meredith Sue**, *Assistant Librarian, Cooper Library*. BS, University of West Alabama, 1995; MLIS, University of Southern Mississippi, 1997
- Gaddis, Joseph L.**, *Professor, Mechanical Engineering*. BS, 1961, MS, 1963, New Mexico State University; PhD, University of Texas, 1969
- Gahan, Linda J.**, *Research Associate/Associate Professor, Biological Sciences*. BS, Bucknell University, 1964; PhD, University of Illinois, 1968
- Galbreath, Peter Fergusson**, *Adjunct Associate Professor, Forestry and Natural Resources*. BA, College of Wooster, 1973; MS, Auburn University, 1979; PhD, Washington State University, 1994
- Gallagher, Colin M.**, *Assistant Professor, Mathematical Sciences*. BS, Sonoma State University, 1993; MS, 1994, PhD, 1998, University of California-Santa Barbara
- Galyean, Ronald D.**, *Professor, Food Science and Human Nutrition*. BS, Southwest Missouri State University, 1966; MS, 1972, PhD, 1975, University of Missouri
- Gambrell, Linda B.**, *Director, Eugene T. Moore School of Education, Professor, Teacher Education*. BS, 1966, MEd, 1970, PhD, 1973, University of Maryland

- Gangemi, Joseph D.**, *Director, Institute for Nutraceutical Research; Professor, Biological Sciences*. BS, Clemson University, 1969; PhD, University of North Carolina School of Medicine, 1973
- Ganter, Susan L.**, *Associate Professor, Mathematical Sciences*. BM, Southern Methodist University, 1986; BS, Southern Methodist University, 1986; MA, 1988, PhD, 1990, University of California-Santa Barbara
- Gao, Xuhong**, *Professor, Mathematical Sciences*. BS, 1983, MS, 1990, Sichuan University (China); PhD, University of Waterloo (Canada), 1993
- Gao, Zhi**, *Assistant Professor, Bioengineering*. BS, 1985, MS, 1988, Tianjin University (China); PhD, University of Miami, 1999
- Garcia, Ricardo A.**, *Associate Professor, Genetics, Biochemistry, and Life Science Studies*. BS, 1968, MEd, 1970, University of Houston; PhD, Texas A&M University, 1975
- Garner, Peggy F.**, *Lecturer, Mathematical Sciences*. BS, Furman University, 1961; MEd, Old Dominion University, 1985
- Garren, Laura A.**, *Lecturer, English*. BA, 1984, MA, 1997, Clemson University
- Garrett, Thomas R.**, *Instructor, Agricultural and Biological Engineering*. BS, 1970, ME, 1974, Clemson University
- Garrison, Arthur W.**, *Adjunct Professor, School of the Environment*. BS, The Citadel, 1956; MS, Clemson University, 1958; PhD, Emory University, 1966
- Gass, John H., Jr.**, *Adjunct Assistant Professor, Electrical and Computer Engineering*. BS, California Institute of Technology, 1991; MS, University of Illinois-Urbana-Champaign, 1993; PhD, Clemson University, 1996
- Gassett, Jonathan W.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, Kennesaw State University, 1993; MS, 1995, PhD, 1999, University of Georgia
- Gaubert, James G.**, *Lecturer, Marketing*. BS, 1982, MBA, 1984, Nicholls State University
- Gauderer, Michael W. L.**, *Adjunct Professor, Bioengineering; Head, Pediatric Surgery, Children's Hospital, Greenville Hospital System*. MD, Universidade Federal do Rio de Janeiro (Brazil), 1968
- Gauthreaux, Sidney A.**, *Professor, Biological Sciences*. BS, 1963, MS, 1965, PhD, 1968, Louisiana State University
- Geddes, Doreen S.**, *Associate Professor, Communication Studies*. BS, Florida State University, 1969, MA, University of West Florida, 1982; PhD, Pennsylvania State University, 1988
- Geist, Janice Lynn**, *Lecturer, English*. BSN, Duke University, 1970; MS, 1988, MA, 1998, Clemson University
- Geist, Robert M. III**, *Professor, Computer Science*. BA, 1970, MA, 1980, Duke University; MS, 1973, PhD, 1974, University of Notre Dame
- Gentry, Karen H.**, *Lecturer, English*. BA, University of South Carolina, 1965; MA, Clemson University, 1999
- George-Williams, Sylvia**, *Assistant Librarian, Cooper Library*. BA, Fourah Bay College (Sierra Leone), 1987; MSLS, Clark Atlanta University, 1995
- Gering, Lawrence R.**, *Associate Professor, Forestry and Natural Resources*. BS, University of Maine, 1979; MS, Clemson University, 1982; PhD, University of Georgia, 1985
- Gharpuray, Vasanti M.**, *Adjunct Associate Professor, Bioengineering*. BE, University of Pune (India), 1983; MS, Vanderbilt University, 1986; PhD, Northwestern University, 1990
- Giangiorgi, Robert J.**, *Adjunct Lecturer, Packaging Science*. BS, University of Wisconsin, 1964; MBA, University of Cincinnati, 1966
- Gibbons, J. Whitfield**, *Adjunct Professor, Forestry and Natural Resources*. BS, 1961, MS, 1963, University of Alabama; PhD, Michigan State University, 1967
- Gibson, Lynette M.**, *Assistant Professor, School of Nursing*. BSN, Medical University of South Carolina, 1982; MS, Clemson University, 1987; PhD, University of South Carolina, 2000
- Gilbert, Edwin D.**, *Lecturer, Graphic Communications*. BS, 1974, MA, 1977, Appalachian State University
- Gill, Roger L.**, *Director, University Center*. BA, West Virginia University Institute of Technology, 1967; MA, West Virginia University, 1972; PhD, Florida State University, 1980
- Gillespie, Jackie S.**, *Lecturer, School of Nursing*. BS, Clemson University, 1975; MN, University of South Carolina, 1979
- Gimenez, Tomas**, *Professor, Animal and Veterinary Sciences*. MVZ, National University of Mexico (Mexico), 1969; DrMedVet, Institut für Physiologie Technische Universität München (Germany), 1975
- Ginestet-Levine, Bernadette**, *Lecturer, Languages*. BA, 1967, MA, 1971, Université de Caen (France)
- Girgis, Adly A.**, *Duke Power Distinguished Professor, Electrical and Computer Engineering*. BS, 1967, MS, 1973, Assiut University (Egypt); PhD, Iowa State University, 1981
- Glaser, Marianne Herr**, *Lecturer, Communication Studies*. BS, Clemson University, 1999
- Glover, James B.**, *Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences*. BS, University of Charleston, 1986; MS, Marshall University, 1988; PhD, University of Louisville, 1993
- Goddard, Wayne D.**, *Associate Professor, Computer Science*. BS, 1985, BS, 1986, PhD, 1989, University of Natal-Dunbar (South Africa); PhD, Massachusetts Institute of Technology, 1992
- Gomes, Roger**, *Associate Professor, Marketing*. BSME, University of Massachusetts, 1972; MBA, Bryant College, 1977; PhD, Virginia Polytechnic Institute and State University, 1988
- Gooden, Dewitt Talmadge III**, *Professor, Pee Dee Research and Education Center*. BS, 1966, MS, 1972, PhD, 1974, North Carolina State University
- Gooding, Charles H.**, *Professor, Chemical Engineering*. BS, 1970, MS, 1972, Clemson University; PhD, North Carolina State University, 1979; PE
- Goodstein, Richard E.**, *Department Chair and Professor, Performing Arts; Director of Bands*. BM, Miami University, 1975; MM, 1981, PhD, 1984, Arizona State University
- Goodwin, James G., Jr.**, *Department Chair and Professor, Chemical Engineering*. BS, Clemson University, 1967; MS, Georgia Institute of Technology, 1969; PhD, University of Michigan, 1976
- Goodyear, Grant P.**, *Assistant Professor, Chemistry*. BS, University of Missouri, 1991; PhD, Brown University, 1997
- Gordon, David B.**, *Associate Professor, Economics*. BA, 1979, PhD, 1995, University of Chicago
- Gordon, David H.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, Michigan State University, 1977; MS, Oklahoma State University, 1981; PhD, Michigan State University, 1985
- Gorsuch, Clyde S.**, *Professor, Entomology, Soils, and Plant Sciences*. BS, University of Wisconsin-Oshkosh, 1971; MS, 1974, PhD, 1978, University of Wisconsin-Madison
- Goss, Benjamin D.**, *Assistant Professor, Parks, Recreation, and Tourism Management*. BS, 1995, MS, 1996, Louisiana Technical University, EdD, University of Southern Mississippi, 1999
- Goswami, Bhuvnesh C.**, *Alumni Distinguished Professor of Textiles, School of Materials Science and Engineering*. BS, University of Delhi (India), 1959; MS, University of Bombay (India), 1963; PhD, Victoria University of Manchester (England), 1966
- Govdy, John N.**, *Department Chair and Professor, Electrical and Computer Engineering*. BS, Massachusetts Institute of Technology, 1967; MS, 1968, PhD, 1971, University of Missouri
- Graham, Mark T.**, *Lecturer, Physics and Astronomy*. BA, 1990, BS, 1990, Millsaps College; MS, 1993, PhD, 1998, Vanderbilt University
- Graham, Robert A.**, *Lecturer, Applied Economics and Statistics*. BS, 1968, MS, 1969, Clemson University
- Gramopadhye, Anand K.**, *Department Chair and Professor, Industrial Engineering*. BE, Victoria Jubilee Technical Institute, 1987; MS, 1989, PhD, 1992, State University of New York-Buffalo
- Granberg, Ellen M.**, *Assistant Professor, Sociology*. BA, University of California-Davis, 1984; MA, 1997, PhD, 2001, Vanderbilt University
- Grant, H. Roger**, *Professor, History*. BA, Simpson College, 1966; MA, 1967, PhD, 1970, University of Missouri-Columbia
- Grant, Rebecca S.**, *Adjunct Lecturer, School of Nursing*. BS, 1983, MSN, 1989, University of South Carolina
- Green, Juana I.**, *Assistant Professor, English*. BA, Brown University, 1990; MA, 1992, MPhil, 1996, PhD, 1999, Columbia University
- Green, Keith E.**, *Associate Professor, School of Architecture*. BA, University of Pennsylvania, 1985; MARCH, University of Illinois, 1990; MS, 1993, PhD, 1998, University of Pennsylvania
- Green, Robert P., Jr.**, *Alumni Professor, Teacher Education*. BA, University of the South, 1970; MA, 1972, EdD, 1977, University of Virginia
- Greenberg, Cathryn H.**, *Adjunct Assistant Professor, Biological Sciences*. BA, George Washington University, 1982; MS, University of Tennessee, 1988; PhD, University of Florida, 1993
- Greene, Annel K.**, *Professor, Animal and Veterinary Sciences*. BS, 1982, MS, 1985, Louisiana State University; PhD, Mississippi State University, 1988
- Greenstein, Joel S.**, *Associate Professor, Industrial Engineering*. BS, University of Illinois, 1973; MS, Stanford University, 1974; PhD, University of Illinois, 1979
- Gregory, Richard V.**, *Adjunct Professor, Materials Science and Engineering*. BS, Old Dominion University, 1980; PhD, Clemson University, 1984
- Gresham, Charles A.**, *Associate Professor, Forestry and Natural Resources*. BS, University of Georgia, 1970; MS, 1972, PhD, 1975, Duke University
- Gresham, Sallie M.**, *Assistant Professor, English*. BA, Hendrix College, 1991; MA, 1994, PhD, 2000, University of Louisville
- Griffin, Barbara**, *Professor, Leadership, Technology, and Counselor Education*. BSW, Florida State University, 1967; MEd, Indiana University of Pennsylvania, 1969; EdS, University of Bridgeport, 1975; PhD, Florida State University, 1979
- Griffin, Brian E.**, *Assistant Professor, Military Leadership; Major U. S. Army*. BA, Tuskegee University, 1989
- Grigsby, David W.**, *Associate Dean, College of Business and Behavioral Science; Professor, Management*. BBA, Baylor University, 1968; MBA, The Citadel, 1975; PhD, University of North Carolina, 1980
- Grimes, Lawrence W.**, *Professor, Applied Economics and Statistics*. BS, 1972, MS, 1974, University of Georgia; PhD, Ohio State University, 1978
- Grosby, Steven E.**, *Professor, Philosophy and Religion*. BA, Brandeis University, 1983; PhD, University of Chicago, 1989
- Grossman, Harold C.**, *Associate Professor, Computer Science*. BS, University of Cincinnati, 1968; MS, New Mexico State University, 1971; PhD, Michigan State University, 1978
- Grossman, Jacqueline L.**, *Lecturer, Materials Science and Engineering*. BTT, Clemson University, 1986; BS, 1972, MA, 1976, Michigan State University
- Grove, Harold J.**, *Associate Professor, Parks, Recreation, and Tourism Management*. BS, 1961, MEd, 1963, Pennsylvania State University

- Grove, Stephen J., *Professor, Marketing*. BA, 1972, MA, 1975, Texas Christian University; PhD, Oklahoma State University, 1979
- Grover, Varun, *William S. Lee Distinguished Professor of Information Systems, Management, B.Tech*, Indian Institute of Technology Delhi (India), 1982; MBA, Southern Illinois University, 1985; PhD, University of Pittsburgh, 1990
- Grubb, C. Alan, *Associate Professor, History*. BA, Washington and Lee University, 1963; MA, 1964, PhD, 1969, Columbia University
- Grujicic, Mica, *Wilfred P. and Helen S. Tiencken Professor, Mechanical Engineering*. BEng, 1975, MEng, 1978, University of Belgrade (Yugoslavia); PhD, Massachusetts Institute of Technology, 1983
- Guffey, Daryl M., *Associate Professor, School of Accountancy and Legal Studies*. BS, Appalachian State University, 1971; BS, University of South Carolina-Spartanburg, 1982; MA, Appalachian State University, 1972, PhD, University of South Carolina, 1989; CPA, CIA, CMA
- Gugerty, Leo J., *Assistant Professor, Psychology*. BA, State University of New York-Buffalo, 1975; PhD, University of Michigan, 1989
- Gwynn, David C., Jr., *Professor, Forestry and Natural Resources*. BS, 1968, MS, 1973, PhD, 1975, Virginia Polytechnic Institute and State University
- Hains, John J., *Adjunct Assistant Professor, Biological Sciences*. BS, North Carolina State University, 1971; MS, 1981, PhD, 1987, Clemson University
- Hakes, John K., *Assistant Professor, Economics*. BA, University of Florida, 1991; MA, 1993, PhD, 1996, Duke University
- Hale, Trent C., *Assistant Professor, Horticulture*. BS, University of West Alabama, 1996; MS, Auburn University, 1998; PhD, Texas A&M University, 2001
- Haley-Zitlin, Vivian J., *Associate Professor, Food Science and Human Nutrition*. BS, University of Kentucky, 1977; PhD, University of Tennessee, 1991
- Halface, Robert G., *University Ombudsman, Alumni Professor, Horticulture*. BS, 1963, MS, 1965, Clemson University; PhD, Virginia Polytechnic Institute and State University, 1968; MLA, North Carolina State University, 1973
- Haliene, Rita M., *Lecturer, Food Science and Human Nutrition*. BS, Ohio State University, 1975; MS, Ball State University, 1982
- Hall, Karen Carlson, *Lecturer, Biological Sciences*. BS, Western Carolina University, 1996; MS, Clemson University, 1999
- Hall, Michelle A., *Extension Associate/Associate Professor, Animal and Veterinary Sciences*. BS, 1975, MS, 1977, PhD, 1982, University of Wisconsin
- Hammit, Michael D., *Department Chair and Professor, Applied Economics and Statistics*. BA, University of Kansas, 1967; PhD, Washington State University, 1978
- Hammit, William E., *Professor, Parks, Recreation, and Tourism Management*. BS, Bluffton College, 1965; BS, 1968, ME, 1969, PhD, 1978, University of Michigan
- Hammond, Robert Gordan, *Instructor, Agricultural and Biological Engineering*. BS, Clemson University, 1977
- Han, Young J., *Professor, Agricultural and Biological Engineering*. BS, 1979, MS, 1981 Seoul National University (Korea); PhD, University of Illinois, 1986; PE
- Hanks, Timothy W., *Adjunct Associate Professor, Chemistry*. BS, South Dakota School of Mines and Technology, 1982; PhD, Montana State University, 1986
- Hanlin, Hugh G., *Adjunct Professor, Forestry and Natural Resources*. BS, 1972; MS, 1975, Auburn University; PhD, Oregon State University, 1980
- Hanna, Marion L., Jr., *Lecturer, Mathematical Sciences*. BS, 1994, MS, 1996, Clemson University
- Hanson, William R., *Chair and Professor, Military Leadership: Lieutenant Colonel U.S. Army*. BA, Oregon State University, 1980; MS, University of Southern California, 1991
- Haque, Imtiaz Ul, *Department Chair and Professor, Mechanical Engineering*. BS, University of Engineering and Technology (Pakistan), 1971, MS, 1977, PhD, 1982, Clemson University
- Haque, Mary B. Taylor, *Alumni Professor, Horticulture*. BA, Sweet Briar College, 1973; MLA, North Carolina State University, 1978
- Harcum, Sarah W., *Associate Professor, Chemical Engineering*. BS, University of Michigan-Ann Arbor, 1986; MS, Colorado State University, 1988; PhD, University of Maryland, 1993
- Harder, Lillian Utsey, *Director, Brooks Center for the Performing Arts; Professor, Performing Arts*. BA, Coker College, 1965; MM, Converse College, 1967
- Hardesty, Nancy A., *Professor, Philosophy and Religion*. BA, Wheaton College, 1963; MSJ, Northwestern University, 1964; PhD, University of Chicago, 1976
- Hargett, David L., *Adjunct Associate Professor, Forestry and Natural Resources; Adjunct Associate Professor, School of the Environment*. BS, 1976, MS, 1979, North Carolina State University; PhD, University of Wisconsin, 1983
- Harrell, William R., *Assistant Professor, Electrical and Computer Engineering*. BS, 1981, MS, 1983, University of Kentucky; PhD, University of Maryland, 1994
- Harris, John M., *Adjunct Assistant Professor, Industrial Engineering*. BA, Gustavus Adolphus College, 1992; MS, University of Oxford (England), 1996; PhD, Clemson University, 1999
- Harris, John M., Jr., *Associate Professor, Finance*. BS, 1973, MBA, 1975, PhD, 1980, University of South Carolina
- Harris, Robert A., *Research Associate/Associate Professor, Strom Thurmond Institute*. BS, 1971, MS, 1973, Clemson University; PhD, Virginia Polytechnic Institute and State University, 1977
- Harris, Scott K., *Lecturer, Languages*. BA, 1980, MAT, 1985, University of South Carolina
- Harrison, Graham M., *Assistant Professor, Chemical Engineering*. BS, Stanford University, 1991; PhD, University of California-Santa Barbara, 1997
- Harrison, Howard E., *Adjunct Professor, Horticulture*. BS, University of Georgia, 1974; MS, Clemson University, 1976; PhD, University of Illinois, 1980
- Harritos, Harry C., *Associate Professor, School of Architecture*. BArch, 1969, MArch, 1979, Clemson University; AIA
- Hartel, Peter G., *Adjunct Associate Professor, Entomology, Soils, and Plant Sciences*. BS, University of Alaska, 1972; BS, University of Washington, 1976; PhD, Oregon State University, 1984
- Hartmann, David J., *Professor, Performing Arts*. BFA, University of Wisconsin-Whitewater, 1982; MFA, University of Minnesota-Twin Cities, 1986
- Hartmann, Dieter H., *Associate Professor, Physics and Astronomy*. BA, 1982, MA, 1982, University of Göttingen (Germany); PhD, University of California, 1989
- Hashima, Patricia Y., *Research Associate/Assistant Professor, Family and Neighborhood Life*. BA, Mills College, 1983; MA, University of California-Davis, 1987; PhD, University of Nebraska, 1996
- Hassell, Richard L., *Associate Professor, Horticulture, Coastal Research and Education Center*. BS, Brigham Young University, 1977; MS, Cornell University, 1979; PhD, Ohio State University, 1993
- Hatfield, Emma N., *Lecturer, School of Nursing*. BS, 1968, MA, 1972, State University of New York
- Hatley, Bradley D., *Lecturer, English*. BA, University of Iowa, 1980, MA, Clemson University, 1995
- Havice, Pamela A., *Assistant Professor, Leadership, Technology, and Counselor Education*. BS, 1980, MS, 1984, Fort Hays State University; PhD, Clemson University, 1999
- Havice, William L., *Associate Dean, College of Health Education, and Human Development, Professor, Leadership, Technology, and Counselor Education*. BS, 1977, MS, 1979, Fort Hays State University; EdS, Pittsburg State University, 1984; PhD, Kansas State University, 1994
- Hawdon, James E., *Associate Professor, Sociology*. BA, Pennsylvania State University, 1985; MA, 1988, PhD, 1992, University of Virginia
- Hawes, Robert H., *Adjunct Professor, Bioengineering*. AB, Indiana University, 1976; MD, Indiana University School of Medicine, 1980
- Hawkins, Harold G., *Adjunct Assistant Professor, Parks, Recreation, and Tourism Management*. BS, 1990, MS, 1995, PhD, 1999, Clemson University
- Hawkins, Katherine W., *Department Chair and Professor, Communication Studies*. BA, University of Virginia, 1980, MA, 1982, PhD, 1986, University of Texas
- Havasaki, Steven S., *Professor, Biological Sciences*. BS, Pennsylvania State University, 1969, MS, 1972, PhD, 1975, Oregon State University
- Hayes, John C., *Associate Dean and Program Director, Environmental Conservation, Professor, Agricultural and Biological Engineering*. BS, 1974; MSAE, 1976, Clemson University; PhD, University of Kentucky, 1979; PE
- Headley, Karly Neal, *Professor, Teacher Education*. BS, Ed, 1974, MEd, 1976, University of Georgia; EdD, Auburn University, 1987
- Heath, Wayne H., *Lecturer, English*. BA, The Citadel, 1974; MA, Clemson University, 1976
- Heckel, David G., *Adjunct Professor, Biological Sciences*. BA, University of Rochester, 1975; PhD, Stanford University, 1980
- Hecker, Douglas A., *Assistant Professor, School of Architecture*. BA, University of Florida, 1990; MArch, Columbia University, 1994
- Hedden, Roy L., *Professor, Forestry and Natural Resources*. BSFR, 1971, MS, 1972, PhD, 1976, University of Washington
- Hedetniemi, Sandra M., *Professor, Computer Science*. BA, Centre College, 1971, MS, 1973, PhD, 1977, University of Virginia
- Hedetniemi, Stephen T., *Professor, Computer Science*. BS, 1960, MS, 1962, PhD, 1966, University of Michigan
- Heifferon, Barbara A., *Associate Professor, English*. BA, 1993, MA, 1994, PhD, 1998, University of Arizona
- Heimke, Gunther Fa., *Adjunct Professor, Bioengineering*. BS, 1951, MS, 1953, PhD, 1959, University of Halle (Germany)
- Helms, Doris R., *Vice President for Academic Affairs and Provost, Professor, Biology*. BS, Bucknell University, 1967; PhD, University of Georgia, 1973
- Helsel, Beth A. W., *Librarian, Cooper Library, Head of Library Systems*. BA, University of Oklahoma, 1965; MLS, University of California, 1971
- Heniford, B. Todd, *Adjunct Assistant Professor, Bioengineering*. BS, Clemson University, 1985; MD, Medical University of South Carolina, 1989
- Henry, Mark S., *Professor, Applied Economics and Statistics*. BA, Baker University, 1968; PhD, Kansas State University, 1973
- Henry, Raymond M., *Instructor, Management*. BA, University of Virginia, 1994; MS, 1998, PhD, 2003, Virginia Commonwealth University
- Henson, J. Michael, *Adjunct Professor, School of the Environment*. BS, University of South Carolina, 1975; MS, Clemson University, 1978; PhD, University of Florida, 1983
- Herrman, Heather M., *Lecturer, English*. BSJ, University of Kansas, 2001; MA, Clemson University, 2003

- Heusinkveld, Paula R.**, *Director, Language and International Trade; Professor, Languages*. BA, Central College, 1968; MA, 1969, PhD, 1979, University of Wisconsin
- Hewitt, Robert R.**, *Visiting Assistant Professor, Planning and Landscape Architecture*. BA, 1976, BSLA, 1993, MSLA, 1996, MCF, 1996, University of California-Davis
- Hickman, James J.**, *Hunter Endowed Chair and Associate Professor, Bioengineering*. BS, 1983, MS, 1985, Pennsylvania State University; PhD, Massachusetts Institute of Technology, 1990
- Higdon, Homer L. III**, *Adjunct Assistant Professor, Animal and Veterinary Sciences*. BS, 1988, MS, 1995, Angelo State University; PhD, Clemson University, 1999
- Hilderman, Richard H.**, *Department Chair and Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Jamestown College, 1966; PhD, University of Missouri, 1972
- Hill, Hoke S., Jr.**, *Professor, Applied Economics and Statistics*. BS, The Citadel, 1971; MS, 1974, PhD, 1979, Clemson University
- Hillgoss, Susan J.**, *Professor, English*. BA, University of Michigan, 1970; MA, 1971, PhD, 1977, University of Pennsylvania
- Hinton, Thomas G.**, *Adjunct Associate Professor, School of the Environment*. BS, 1976, MS, 1983, PhD, 1989, Colorado State University
- Hiott, William D.**, *Director, Historic Properties; Adjunct Instructor, History*. BA, 1983, MA, 1986, University of South Carolina
- Hirt, Douglas E.**, *Associate Professor, Chemical Engineering*. BS, 1982, MS, 1984, Virginia Polytechnic Institute and State University; PhD, Princeton University, 1990
- Hochrine, Catherine A.**, *Lecturer, Computer Science*. BA, East Stroudsburg University of Pennsylvania, 1990; MS, Clemson University, 1999
- Hodge, Martha J.**, *Associate Professor, Teacher Education*. BS, Memphis State University, 1976; MA, University of North Alabama, 1983; PhD, Vanderbilt University, 1995
- Hoeffner, Steve L.**, *Research Associate/Assistant Professor, Chemical Engineering/Technology Laboratory; Adjunct Assistant Professor, School of the Environment*. BS, Colorado School of Mines, 1978; PhD, University of Missouri-Columbia, 1983
- Hogan, Robert J.**, *Professor, School of Architecture*. BArch, 1974, MArch, 1976, Virginia Polytechnic Institute and State University
- Holaday, Bonnie J.**, *Dean, Graduate School; Professor, Nursing*. BS, Arizona State University, 1969; MN, University of California-Los Angeles, 1973; DNS, University of California-San Francisco, 1979
- Holbrook, Flint**, *Adjunct Instructor, Agricultural and Biological Engineering*. BS, 1980, MS, 1986, Clemson University
- Holder, Barbara J.**, *Associate Professor, School of Nursing*. BS, 1975, MA, 1976, PhD, 1986, New York University
- Holley, Edward J.**, *Department Chair and Associate Librarian, Cooper Library; Head of Resource Sharing and Copier Services*. BA, Furman University, 1981; MSLS, University of North Carolina, 1983
- Holton, Winston E.**, *Lecturer, Teacher Education*. BA, 2000, MEd, 2003, Clemson University
- Hood, William M.**, *Professor, Entomology, Soils, and Plant Sciences*. BS, 1973, MS, 1977, Clemson University; PhD, University of Georgia, 1986
- Hoover, Adam W.**, *Assistant Professor, Electrical and Computer Engineering*. BS, 1992, MS, 1993, PhD, 1996, University of South Florida
- Hopkins, Christopher D.**, *Assistant Professor, Marketing*. BS, Concord College, 1987; MBA, Radford University, 1995; PhD, Mississippi State University, 2001
- Horton, Dan L.**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BS, 1973, MS, 1978, Clemson University; PhD, University of Arkansas, 1982
- Horton, Paul M.**, *Senior Extension Director, Sandhill Research and Education Center; Professor, Entomology, Soils, and Plant Sciences*. BS, 1969, MS, 1973, Clemson University; PhD, Auburn University, 1981
- Horton, Robert M.**, *Assistant Professor, Teacher Education*. BS, University of Wisconsin-Madison, 1974; MEd, Miami University, 1983; EdD, University of Cincinnati, 1997
- Horvath, Michael**, *Assistant Professor, Psychology*. BS, Bowling Green State University, 1996; MA, 1999, PhD, 2001, Michigan State University
- Hoskins, Barbara J.**, *Assistant Dean, HEHD Office of Distance Education*. BS, 1983, MBA, 1990, EdD, 1998, University of Cincinnati
- Hosler, Ned M.**, *Associate Professor, Performing Arts*. BMEd, 1976, MA, 1985, PhD, 1992, Ohio State University
- Howard, Gordon E.**, *Professor, Parks, Recreation, and Tourism Management*. BA, 1963, MA, 1964, University of North Carolina; PhD, University of Michigan, 1968
- Howard, Lance E.**, *Lecturer, History*. BS, University of Michigan, 1972; MS, 1986, PhD, 1994, University of California
- Howard, Tharon W.**, *Professor, English*. BA, University of Missouri, 1985; MA, 1987, PhD, 1992, Purdue University
- Howe, Linda A.**, *Assistant Professor, School of Nursing*. BSN, University of Texas, 1982; MS, Texas Woman's University, 1988; MA, The Citadel, 1992; PhD, University of South Carolina, 1997
- Howell, Robert, Jr.**, *Assistant Professor, Aerospace Studies; Major U.S. Air Force*. BA, Angelo State University, 1991; MS, Abilene Christian University, 1993
- Howle, David S.**, *Department Head, Fertilizer and Seed Certification Services; Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences*. BS, 1975, MS, 1980, Clemson University; PhD, University of Arkansas, 1984
- Hoyle, Elizabeth H.**, *Professor, Packaging Science*. BS, Limestone College, 1972; MS, Winthrop University, 1977
- Hoyt, Greg D.**, *Adjunct Professor, Horticulture*. BS, Kent State University, 1972; MS, Ohio State University, 1975; PhD, University of Georgia, 1981
- Hu, Xiaobo**, *Associate Professor, Political Science*. BA, Institute of International Relation (China), 1984; LLM, Beijing University (China), 1986; PhD, Duke University, 1994
- Huang, Yong**, *Assistant Professor, Mechanical Engineering*. BS, Xidian University (China), 1993; MS, Zhejiang University (China), 1996; MS, University of Alabama, 1999; MS, 2002, PhD, 2002, Georgia Institute of Technology
- Hubbard, Stephen J.**, *Visiting Assistant Professor, Electrical and Computer Engineering*. BS, Clemson University, 1985; MS, University of Wisconsin, 1986; PhD, Georgia Institute of Technology, 1994
- Huey, Cecil O., Jr.**, *Professor, Mechanical Engineering*. BS, 1965, MSME, 1968, PhD, 1973, Clemson University; PE
- Huff, Raymond T.**, *Assistant Professor, School of Architecture*. BArch, Clemson University, 1971; AIA
- Huffman, John W.**, *Professor, Chemistry*. BS, Northwestern University, 1954; MA, 1956, PhD, 1957, Harvard University
- Hughes, Thomas A.**, *Professor, Biological Sciences*. BS, South Carolina State University, 1975; MS, 1978, PhD, 1981, North Carolina State University
- Huneycutt, Tyler B. III**, *Assistant Director, Management*. BS, United States Military Academy, 1964; MS, Air Force Institute of Technology, 1973
- Hunt, Patrick G.**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BS, 1965, MS, 1966, Clemson University; PhD, University of Florida, 1970
- Hupp, Harold D.**, *Professor, Animal and Veterinary Sciences*. BS, Wilmington College, 1971; MS, University of Kentucky, 1973; PhD, Virginia Polytechnic Institute and State University, 1977
- Hurley, Joni K.**, *Associate Professor, Languages*. BA, 1976, MA, 1978, PhD, 1992, University of Pittsburgh
- Hurt, N. Jane**, *Associate Professor, School of Architecture*. BArch, Pennsylvania State University, 1970; MEnvDes, Yale University, 1972; PhD, University of Nottingham (England), 1986
- Husson, Scott M.**, *Assistant Professor, Chemical Engineering*. BS, Pennsylvania State University, 1993; PhD, University of California, 1998
- Hutton, William C.**, *Adjunct Professor, Bioengineering*. BS, University of Strathclyde (England), 1962; MS, 1963, PhD, 1984, University of Birmingham (England)
- Hwu, Shiou-jyh**, *Professor, Chemistry*. BS, Fu Jen Catholic University (China), 1978; MS, Western Michigan University, 1979; PhD, Iowa State University, 1985
- Hyden, Paul D.**, *Assistant Professor, Mathematical Sciences*. BS, 1996, MS, 1999, PhD, 2003, Cornell University
- Igo, Larry Brent**, *Lecturer, Teacher Education*. BS, University of South Florida, 1995; MA, 2001, PhD, 2003, University of Nebraska-Lincoln
- Ingram, Samuel T.**, *Department Chair and Professor, Graphic Communications*. BA, Appalachian State University, 1978; MEd, 1982, EdD, 1985, Clemson University
- Irvine, David L.**, *Physician Advisor, Joseph F. Sullivan Center; Lecturer, School of Nursing*. BS, Virginia Polytechnic Institute and State University, 1972; MD, Virginia Commonwealth University, 1976
- Isbell, Clinton H.**, *Professor, Leadership, Technology, and Counselor Education*. BA, 1969, MEd, 1974, Sam Houston State University, EdD, Texas A&M University, 1980
- Iseely, John J.**, *Leader, South Carolina Cooperative Fish and Wildlife Research Unit; Professor, Forest and Natural Resources*. BS, University of Michigan, 1979; BS, Kent State University, 1979; MA, Southern Illinois University, 1981; PhD, Texas A&M University, 1984
- Jackson, D. Michael**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BS, Michigan State University, 1971; MS, 1975, PhD, 1978, Washington State University
- Jackson, Debra B.**, *Associate Provost for Academic Affairs and Assistant to the President; Professor, Public Health Sciences*. BSN, Medical University of South Carolina, 1971; MN, ENSY University, 1975; PhD, Georgia State University, 1983
- Jackson, Nancy S.**, *Assistant Professor, Communication Studies*. BA, 1969, MA, 1978, PhD, 1984, University of Colorado
- Jacobi, Jane E.**, *Lecturer, Center for Advanced Engineering, Fibers and Films*. BA, Saint Olaf College, 1976; MA, University of Oregon, 1979
- Jacobi, Martin J.**, *Professor, English*. BA, Canisius College, 1971; MA, 1979, PhD, 1984, University of Oregon
- Jacobs, David P.**, *Professor, Computer Science*. BA, DePauw University, 1971; MA, 1972, PhD, 1976, University of Missouri; MS, Georgia Institute of Technology, 1981
- Jahn, Judson R.**, *Lecturer, School of Accountancy and Legal Studies*. BS, Limestone College, 1991; MBA, Clemson University, 1998; JD, Mercer University, 1994
- Jalili, Nader**, *Assistant Professor, Mechanical Engineering*. BS, 1992, MS, 1995, Sharif University of Technology (Iran); PhD, University of Connecticut, 1998
- James, Kevin L.**, *Assistant Professor, Mathematical Sciences*. BS, 1991, PhD, 1997, University of Georgia
- Jamison, Robert E.**, *Professor, Mathematical Sciences*. BS, Clemson University, 1970; MS, 1973, PhD, 1974, University of Washington
- Jarvis, Christine W., J. E.**, *Sirrine Professor, Textiles*. BS, University of North Carolina, 1971; PhD, Massachusetts Institute of Technology, 1975

- Jarvis, James P.**, *Professor, Mathematical Sciences*. BS, University of North Carolina, 1971; MS, 1973; PhD, 1975, Massachusetts Institute of Technology
- Jeffers, Steven Nye**, *Associate Professor, Entomology, Soils, and Plant Sciences*. BS, University of California-Davis, 1976; MS, 1980, PhD, 1985, Cornell University
- Jenkins, Eleanor W.**, *Assistant Professor, Mathematical Sciences*. BS, Wofford College, 1988; MS, Clemson University, 1990; PhD, North Carolina State University, 2000
- Jenkins, Thomas C.**, *Professor, Animal and Veterinary Sciences*. BS, 1973; MS, 1975, Pennsylvania State University; PhD, Cornell University, 1979
- Jennings, Gregory Donald**, *Adjunct Professor, Forestry and Natural Resources*. BS, 1984; MS, 1986, Pennsylvania State University; PhD, University of Nebraska, 1990
- Jensen, Heidi J.**, *Assistant Professor, Art*. BFA, University of Minnesota-Duluth, 1997; MFA, University of North Carolina, 1999
- Jerzmanowski, Michal Maria**, *Assistant Professor, Economics*. MA, Warsaw University, 1998; MA, 2000, PhD, 2003, Brown University
- Jiang, Huabei**, *Professor, Physics and Astronomy*. BS, 1984, PhD, 1988, University of Electronic Science and Technology of China (China); PhD, Dartmouth College, 1995
- Jiang, Xiuping**, *Assistant Professor, Food Science and Human Nutrition*. BS, 1984; MS, 1987, Ocean University of Qingdao (China); PhD, University of Maryland, 1996
- Jodice, Patrick G.**, *Assistant Professor, Forestry and Natural Resources*. BS, University of Maine, 1983; MS, University of Florida, 1990; PhD, Oregon State University, 1999
- Johnson, Alan R.**, *Assistant Professor, Forestry and Natural Resources*. BS, Colorado State University, 1980; PhD, University of Tennessee, 1988
- Johnson, Albert W.**, *Professor, Entomology, Soils, and Plant Sciences*. *Pee Dee Research and Education Center*. BS, 1966; MS, 1968, Clemson University; PhD, Auburn University, 1971
- Johnson, James**, *Adjunct Professor, Public Health Sciences*. BA, University of Maryland, 1978; MS, University of South Alabama, 1980; MPA, Auburn University, 1982; PhD, Florida State University, 1987
- Johnson, Kendra Lynette**, *Assistant Professor, Performing Arts*. BA, James Madison University, 1987; MFA, University of Tennessee, 1994
- Johnson, Steven D.**, *Associate Librarian, Cooper Library*. BSFS, Georgetown University, 1968; MLS, Rutgers University, 1973
- Johnson, Terri A.**, *Lecturer, Mathematical Sciences*. BS, Ball State University, 1974; MS, University of South Carolina, 1982; PhD, Clemson University, 1992
- Jones, Carol D.**, *Lecturer, Graphic Communications*. BS, 1988; MS, 1996, Clemson University
- Jones, Douglas Charles**, *Director, Greenville Urban Center Professor, School of Architecture*. BArch, University of Illinois, 1966; MArch, University of Pittsburgh, 1972
- Jones, George L.**, *Visiting Assistant Professor, Leadership, Technology, and Counselor Education, Counselor, Counseling Center*. PhD, Florida Institute of Technology, 1986
- Jones, James H.**, *Lecturer, Computer Science*. BS, Clemson University, 1957
- Jones, Karyn O.**, *Assistant Professor, Communication Studies*. BS, Georgia Southern University, 1992; MA, 1994, PhD, 2003, University of Georgia
- Jones, Michael A.**, *Associate Professor, Entomology, Soils, and Plant Sciences*. BS, 1989; MS, 1991, PhD, 1994, North Carolina State University
- Jones, Roy I.**, *Lecturer, Teacher Education*. BA, University of Massachusetts-Amherst, 1972; MA, Atlanta University, 1977; EdD, University of Georgia, 1981
- Jones, Walker A.**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BA, University of Mississippi, 1973; MS, 1976, PhD, 1979, Clemson University
- Jones, Walter J.**, *Adjunct Professor, Public Health Sciences*. BA, Pennsylvania State University, 1974; MA, 1975, PhD, 1980, MHSIA, 1991, University of Wisconsin
- Jordan, Jennifer Corin Lewis**, *Assistant Professor, Leadership, Technology, and Counselor Education*. BA, University of Central Florida, 1992; MA, Nicholls State University, 1995; PhD, Mississippi State University, 1998
- Joseph, Paul F.**, *Associate Professor, Mechanical Engineering*. BA, Franklin and Marshall College, 1979; MS, 1982, PhD, 1987, Lehigh University
- Juang, Chang-hsein**, *Professor, Civil Engineering*. BS, 1974; MS, 1976, National Cheng Kung University (China); PhD, Purdue University, 1981; PE
- Julian, Dinah Gail**, *Associate Librarian, Cooper Library*. BS, Tennessee Technological University, 1979; MBA, Middle Tennessee State University, 1980; MS, University of Tennessee, 1989
- Kaiser, Eddie H.**, *Professor, Applied Economics and Statistics*. BS, University of Illinois, 1972; PhD, Iowa State University, 1979
- Kalley, Joan W.**, *Lecturer, English*. BA, 1968, MA, 1973, Winthrop University
- Kaminski, Rebecca A.**, *Lecturer, Teacher Education*. BS, West Virginia University, 1971; MEd, 1974, EdD, 1994, University of Pittsburgh
- Kaplan, Daniel L.**, *Adjunct Associate Professor, School of the Environment*. BS, 1977; MS, 1983, University of New Hampshire; PhD, University of Georgia, 1993
- Karanfil, Tanju**, *Associate Professor, School of the Environment*. BS, Istanbul Technical University (Turkey), 1988; MS, 1991, PhD, 1995, University of Michigan
- Karlen, Douglas L.**, *Adjunct Associate Professor, Entomology, Soils, and Plant Sciences*. BS, University of Wisconsin, 1973; MS, Michigan State University, 1975; PhD, Kansas State University, 1978
- Kasperbauer, Michael J.**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BS, 1954; MS, 1957, PhD, 1961, Iowa State University
- Katsiyannis, Antonis**, *Professor, Teacher Education*. BA, Hellenic College-Holy Cross Greek Orthodox, 1983; MEd, Virginia Commonwealth University, 1986; EdD, College of William and Mary, 1989
- Kaup, John G.**, *Lecturer, Chemistry*. BS, Xavier University, 1990; PhD, University of Utah, 1997
- Ke, Pu-Chun**, *Assistant Professor, Physics and Astronomy*. BE, Huazhong University of Science and Technology (China), 1989; MS, 1996, PhD, 2000, Victoria University (Australia)
- Kearney, Stacy S.**, *Assistant Professor, Performing Arts*. BA, Western Michigan University, 1998; MFA, University of Missouri-Kansas City, 2001
- Kegley, Kathleen A.**, *Lecturer, Management*. BS, 1982; MS, 1984, University of Alabama-Birmingham; PhD, Clemson University, 1991
- Keinath, Anthony P.**, *Associate Professor, Entomology, Soils, and Plant Sciences*. *Coastal Research and Education Center*. BS, Michigan State University, 1982; MS, 1985, PhD, 1988, Cornell University
- Keinath, Thomas M.**, *Dean, College of Engineering and Science*. *Professor, Environmental Engineering and Science*. BSE, 1963; MSE, 1964, PhD, 1968, University of Michigan
- Kellam, James Franklin**, *Adjunct Professor, Bioengineering*. BS, 1968; MD, 1973, University of Toronto (Canada)
- Keller, Don E.**, *Professor, Leadership, Technology, and Counselor Education*. BS, 1962; MA, 1968, Southeast Missouri State University; EdD, Indiana University, 1973
- Kelly, John W.**, *Vice President, Public Service and Agriculture*. *Professor, Horticulture*. BS, Clemson University, 1977; MS, 1979, PhD, 1982, Ohio State University
- Kemper, Karen A.**, *Associate Professor, Public Health Sciences*. BS, 1983; MS, 1986, PhD, 1992, University of South Carolina
- Kendall, Todd David**, *Assistant Professor, Economics*. BS, 1998; MA, 2000, PhD, 2003, University of Chicago
- Kennedy, Frances A.**, *Assistant Professor, School of Accountancy and Legal Studies*. BA, University of Saint Thomas, 1975; MBA, Ashland University, 1996; PhD, University of North Texas, 2001; CA
- Kennedy, John M.**, *Professor, Mechanical Engineering*. BS, 1975; MS, 1977, Virginia Polytechnic Institute and State University; PhD, Clemson University, 1984
- Kennedy, Robert H.**, *Adjunct Professor, Biological Sciences*. PhD, Kent State University, 1978
- Key, Jennifer D.**, *Professor, Mathematical Sciences*. BSc, University of Witwatersrand (South Africa), 1963; MPhil, 1967, PhD, 1969, University of London (England)
- Khalilian, Ahmad**, *Professor, Agricultural and Biological Engineering*. *Edson Research and Education Center*. BS, University of Tehran (Iran), 1971; MS, University of California, 1977; PhD, Oklahoma State University, 1980
- Khan, Abdul A.**, *Assistant Professor, Civil Engineering*. BS, 1986; MSc, 1989, PhD, 1995, University of Alberta (Canada)
- Khan, Taufiqur Rahman**, *Assistant Professor, Mathematical Sciences*. AB, Occidental College, 1994; MS, 1999, PhD, 2000, University of Southern California
- Kholodenko, Arkady L.**, *Professor, Chemistry*. MS, Kiev State University (Ukraine), 1976; PhD, University of Chicago, 1982
- Kiessler, Peter C.**, *Associate Professor, Mathematical Sciences*. BS, 1977; MS, 1980, PhD, 1983, Virginia Polytechnic Institute and State University
- Kilbey, S. Michael II**, *Associate Professor, Chemical Engineering*. BS, 1990; PhD, 1995, University of Minnesota
- Kilbourne, William Edward**, *Professor, Marketing*. BBA, 1967; MBA, 1968, PhD, 1973, University of Houston
- Kilgo, John C.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. *Adjunct Assistant Professor, Biological Sciences*. BS, Wofford College, 1979; MS, University of Florida, 1992; PhD, University of Georgia, 1996
- Kim, Byung-joon**, *Adjunct Assistant Professor, School of the Environment*. BS, Seoul National University (Korea), 1970; MS, 1976, PhD, 1981, Polytechnic University
- Kimber, Delbert L., Jr.**, *Professor, Industrial Engineering*. BSE, University of South Florida, 1976; MS, 1978, PhD, 1980, Virginia Polytechnic Institute and State University; PE
- Kimrough-Melton, Robin J.**, *Research Associate/Professor, Family and Neighborhood Life*. BS, Southern Methodist University, 1977; JD, University of Nebraska, 1983
- Kimmel, Robert M.**, *Associate Professor, Packaging Science*. BS, 1964; MS, 1965, MSc, 1967, ScD, 1968, Massachusetts Institute of Technology
- King, Donnie R.**, *Associate Professor, Agricultural and Biological Engineering*. BS, 1977; MS, 1984, Clemson University; PhD, Ohio State University, 1990
- King, Jeremy**, *Associate Professor, Physics and Astronomy*. BA, Boston University, 1988; MS, 1990, PhD, 1993, University of Hawaii
- King, Samuel C.**, *Professor, Languages*. BA, 1966; MA, 1969, PhD, 1971, Louisiana State University
- Kingree, Jeffrey B.**, *Associate Professor, Public Health Sciences*. BA, Vanderbilt University, 1984; MA, Florida Atlantic University, 1991; PhD, Georgia State University, 1993
- Kishimoto, Toshiko**, *Associate Professor, Languages*. BA, Rikkyo University (Japan), 1967; MEd, University of Massachusetts, 1976
- Kishimoto, Yui**, *Professor, School of Architecture*. BArch, Wadsworth University, 1963; MArch, Harvard University, 1965; MEd, University of Massachusetts, 1976; AIA
- Kitagorodskiy, Aleksandr**, *Lecturer and NMR Spectroscopist*. Chemistry, MS, Moscow Physico-Technical Institute (Russia), 1975; PhD, Institute of Chemical Physics, 1979

- Kjen, Karl M.**, *Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences*. BA, Concordia College, 1982; MS, 1989, PhD, University of Minnesota-Twin Cities
- Klaine, Stephen J.**, *Professor, Biological Sciences*. BS, University of Cincinnati, 1979; MS, 1981, PhD, 1982, Rice University
- Klein, Richard E., Jr.**, *Assistant Professor, Management*. BA, 1988, MA, 1988, Boston University; MS, Mercer University, 1997; PhD, Georgia State University, 2002
- Klein, Richard H.**, *Associate Professor, Finance*. BA, City College of New York, 1960; MBA, Dartmouth College, 1962; PhD, University of Texas, 1969
- Klekamp, John W.**, *Adjunct Assistant Professor, Bioengineering*. BS, Miami University, 1986; MD, Mercer University, 1990
- Klep, Viktor Z.**, *Research Associate/Professor, Materials Science and Engineering*. MS, 1985, PhD, 1989, Lviv Polytechnic Institute (Ukraine)
- Knap, Halina T.**, *Professor, Entomology, Soils, and Plant Sciences and Biological Sciences*. BS, 1968, MS, 1970, PhD, 1974, Academy of Agriculture (Poland)
- Knapp, Daniel R.**, *Adjunct Professor, Bioengineering*. BA, University of Evansville, 1965; PhD, Indiana University, 1969
- Knight, David A.**, *Lecturer, College of Business and Behavioral Science*. BA, Erskine College, 1990; MPA, Clemson University, 1997
- Knowles, Patricia A.**, *Associate Professor, Marketing*. BA, Michigan State University, 1976; MA, 1980, PhD, 1987, Bowling Green State University
- Kohl, Michael E.**, *Librarian, Cooper Library; Head of Special Collections*. BA, 1971, MA, 1973, MS, 1974, MBA, 1979, University of Wisconsin
- Kolis, Joseph W.**, *Professor, Chemistry*. BS, Worcester Polytechnic Institute, 1979; PhD, Northwestern University, 1984
- Komo, John J.**, *Professor, Electrical and Computer Engineering*. BSEE, 1962, MSEE, 1963, PhD, 1966, University of Missouri
- Koon, G. William**, *Professor, English*. AB, Newberry College, 1964; MA, Auburn University, 1966; PhD, University of Georgia, 1973
- Kosinski, Robert J.**, *Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Seton Hall University, 1972; PhD, Rutgers University, 1977
- Kostreva, Michael M.**, *Professor, Mathematical Sciences*. BA, Clarion State College, 1971; MS, 1973, PhD, 1976, Rensselaer Polytechnic Institute
- Kourlis, Konstantinos**, *Assistant Professor, Art*. BA, 1990, BA, 1990, MARCH, 1993, PhD, 2003, University of Pennsylvania
- Kowalski, Robin Marie**, *Professor, Psychology*. BA, Furman University, 1985; MA, Wake Forest University, 1987, PhD, University of North Carolina-Greensboro, 1990
- Krause, Lois B.**, *Lecturer, School of the Environment*. BS, 1980, MAT, 1994, Fairleigh Dickinson University; PhD, Clemson University, 1996
- Kuehn, Thomas J.**, *Department Chair and Professor, History*. BA, Carleton College, 1972; MA, 1973, PhD, 1977, University of Chicago
- Kulaskera, Karunaratna B.**, *Professor, Mathematical Sciences*. BS, University of Sri Jayawardenepura (Sri Lanka), 1979; MA, University of New Brunswick (Canada), 1984; PhD, University of Nebraska, 1988
- Kundert-Gibbs, John T.**, *Lecturer, Digital Production Arts*. BA, Princeton University, 1987; MA, 1990, PhD, 1995, Ohio State University
- Kunkel, Mary E.**, *Professor, Food Science and Human Nutrition*. BSE, University of Central Arkansas, 1975; MS, 1976, PhD, 1979, University of Tennessee
- Kurtz, Harry D., Jr.**, *Research Associate/Assistant Professor, Biological Sciences*. BS, Pennsylvania State University, 1984; PhD, University of Idaho, 1989
- Kurz, Mary Elizabeth**, *Assistant Professor, Industrial Engineering*. BS, 1995, MS, 1997, PhD, 2001, University of Arizona
- Kwit, Charles**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, University of Wisconsin-Madison, 1992; PhD, Louisiana State University, 2000
- Kyle, Gerard T.**, *Assistant Professor, Parks, Recreation, and Tourism Management*. BS, University of New South Wales (Australia), 1993; MS, 1998, PhD, 2001, Pennsylvania State University
- Laberge, Marlene**, *Professor, Bioengineering*. DEC, Collège de Jonquière (France), 1978; BS, University of Montreal (Canada), 1983; MS, École Polytechnique of Montreal (Canada), 1985; PhD, University of Montreal (Canada), 1988
- Lafontaine, Daniel E.**, *Lecturer, Livestock and Poultry Health*. DVM, Ohio State University, 1967; MPH, University of Minnesota, 1973
- Laforge, Mary C.**, *Associate Professor, Marketing*. BS, 1965, MA, 1968, Sanford University; PhD, University of Georgia, 1980
- Laforge, Robert L.**, *Alumni Professor, Management*. BS, Clemson University, 1970; MBA, 1971, PhD, 1976, University of Georgia
- Lambert, Renee S.**, *Lecturer, Computer Science*. BS, Eastern Michigan University, 1971
- Lane, Cheryl Olivia**, *Assistant Professor, Teacher Education*. BA, Coker College, 1975; IMA, University of South Carolina, 1993; PhD, Clemson University, 2003
- Langan, Eugene M. III**, *Adjunct Associate Professor, Bioengineering; Associate Director of Surgery, Greenville Hospital System*. BS, 1982, MS, 1983, University of Scranton; MD, Georgetown University, 1987
- Lanham, Joseph D.**, *Associate Professor, Forestry and Natural Resources*. BA, 1988, MS, 1990, PhD, 1997, Clemson University
- Larcom, Lyndon L.**, *Professor, Physics and Astronomy and Biological Sciences*. BS, Carnegie Mellon University, 1962; MS, 1965, PhD, 1968, University of Pittsburgh
- Larsen, Miguel E.**, *Professor, Physics and Astronomy*. BS, University of Rochester, 1975; MS, 1977, PhD, 1979, Cornell University
- Laskar, Renu C.**, *Professor, Mathematical Sciences*. BA, Patna University (India), 1950; MA, Bihar University, 1955; PhD, University of Illinois, 1962
- Lasser, William**, *Alumni Professor, Political Science*. BS, Massachusetts Institute of Technology, 1978; MA, 1983, PhD, 1983, Harvard University
- Latour, Robert A., Jr.**, *Professor, Bioengineering*. BS, University of Virginia, 1979; MS, 1986, PhD, 1989, University of Pennsylvania
- Lauria, Mickey**, *Professor, Planning and Landscape Architecture*. BA, University of California, 1975; MA, 1977, PhD, 1980, University of Minnesota
- Lauridsen, Kelly M.**, *Lecturer, Communication Studies*. BA, University of Georgia, 1998; MA, Miami University, 2000
- Lavare, Jennifer M.**, *Lecturer, Mathematical Sciences*. BS, State University of New York-Fredonia, 1997; MS, Clemson University, 1999
- Law, E. Harry**, *Professor, Mechanical Engineering*. BAEoEng, Rensselaer Polytechnic Institute, 1962; MSE, Princeton University, 1965; PhD, University of Connecticut, 1971
- Layfield, Kevin D.**, *Assistant Professor, Genetics, Biochemistry, and Life Science Studies*. BS, 1989, MAG, 1994, University of Florida; PhD, Pennsylvania State University, 1998
- Layne, Desmond R.**, *Associate Professor, Horticulture*. BS, University of Guelph (Canada), 1986; MS, 1989, PhD, 1992, Michigan State University
- Layton, Patricia A.**, *Department Chair and Professor, Forestry and Natural Resources*. BS, Clemson University, 1976; MS, Texas A&M University, 1978; PhD, University of Florida, 1985
- Leap, Terry L.**, *Department Chair and Professor, Management*. BS, 1970, MPhil, 1971, University of North Carolina; PhD, University of Iowa, 1978
- Leblanc, Janet B.**, *Associate Professor, Art*. BA, 1971, MA, 1974, Michigan State University
- Lee, Andy Wu-Chung**, *Professor, Forestry and Natural Resources*. BS, 1968, MS, 1971, National Taiwan University (China); MS, 1973, PhD, 1978, Auburn University
- Lee, Burtrand L.**, *Professor, Materials Science and Engineering*. BA, Southern College, 1976; MA, Western Michigan University, 1979; MEng, 1985, PhD, 1986, University of Florida
- Lee, Cindy M.**, *Associate Professor, School of the Environment*. BA, Indiana University, 1977; BA, University of Colorado, 1984; PhD, Colorado School of Mines, 1990
- Lee, Connie Wonsik**, *Associate Professor, School of Nursing*. BSN, Ewha Women's University (Korea), 1987; MSN, University of Florida, 1986; EdD, University of Georgia, 1997
- Lee, Eileen H.**, *Adjunct Associate Professor, School of Nursing*. BSN, Boston University, 1967; MSN, University of North Carolina, 1969
- Lee, Evelyn J.**, *Professor, School of Nursing*. BS, Berea College, 1968; MN, University of California, 1974; EdD, University of Southern California, 1984
- Lee, Hyesuk K.**, *Assistant Professor, Mathematical Sciences*. BS, Yonsei University (Korea), 1986; MS, 1995, PhD, 1997, Virginia Polytechnic Institute and State University
- Lee, Jeong Soo**, *Research Associate/Assistant Professor, Chemistry*. BS, 1986, MS, 1994, PhD, 1999, Pusan National University (Korea)
- Legins, Sarah O.**, *Lecturer, Cooper Library*. AB, Bowdoin College, 1993; MS, 2003, MSLS, 2003, Pratt Institute
- Lehmacher, Gerald A.**, *Assistant Professor, Physics and Astronomy*. MS, 1988, PhD, 1993, Bonn University (Germany)
- Leininger, John M.**, *Professor, Graphic Communications*. BS, State University of New York, 1978; MEd, 1981, EdD, 1991, Clemson University
- Leininger, Nancy W.**, *Lecturer, Graphic Communications*. BS, State University of New York, 1977; MEd, Clemson University, 1981
- Leising, Mark D.**, *Professor, Physics and Astronomy*. BS, University of Notre Dame, 1982; MS, 1985, PhD, 1987, Rice University
- Leonard, Michael S.**, *Professor, Industrial Engineering*. BIE, 1970, ME, 1972, PhD, 1973, University of Florida; PE
- Leonard, William H.**, *Professor, Teacher Education*. BA, 1964, MA, 1967, San Jose State University; PhD, University of California, 1976
- Lepetit, Daniel**, *Associate Professor, Languages*. Certificat d'aptitude pédagogique, Education Nationale (France), 1971; Licence des Lettres, 1974, Diplôme d'aptitude, 1975, MA, 1975, University of Besançon (France); PhD, University of Toronto (Canada), 1983
- Lessner, Philip M.**, *Adjunct Professor, Materials Science and Engineering*. BE, Cooper Union, 1980, PhD, University of California-Berkeley, 1986
- Levin, Andrew R.**, *Associate Professor, Performing Arts*. BA, California State University, 1980; MM, Rice University, 1983; DA, Ball State University, 1993
- Lew, William W.**, *Professor, Art*. BA, Central Washington University, 1964; MFA, University of Oregon, 1966; PhD, Ohio University, 1976
- Lewis, Barbara S.**, *Visiting Instructor, Chemistry*. BS, Radford University, 1973

- Lewis, Stephen A.**, *Professor, Entomology, Soils, and Plant Sciences; State Plant Pathologist*. BS, Pennsylvania State University, 1964; MS, Rutgers University, 1969; PhD, University of Arizona, 1973
- Leyba, John D.**, *Adjunct Professor, School of the Environment*. BS, Northeast Missouri State University, 1986; PhD, University of California, 1990
- Leylek, James H.**, *Associate Professor, Mechanical Engineering*. BS, 1976, MS, 1979, PhD, 1984, University of Illinois
- Li-Bleuel, Linda L.**, *Assistant Professor, Performing Arts*. BM, University of Illinois-Urbana-Champaign, 1985; MM, 1987, DMA, 1998, University of Georgia
- Lickfield, Gary C.**, *Associate Professor, Materials Science and Engineering*. BS, Ursinus College, 1978; PhD, Clemson University, 1983
- Liebenberg, Donald H.**, *Adjunct Professor, Physics and Astronomy*. BS, 1954, MS, 1956, PhD, 1971, University of Wisconsin
- Ligon, Walter B.**, *Associate Professor, Electrical and Computer Engineering*. BS, 1987, MS, 1988, PhD, 1992, Georgia Institute of Technology
- Limber, Susan P.**, *Associate Director, Family and Neighborhood Life*. BA, University of Virginia, 1985; MLS, 1990, MA, 1990, PhD, 1992, University of Nebraska-Lincoln
- Lindsay, Cotton M.**, *J. Wilson Newman Professor, Economics*. BBA, University of Georgia, 1962; PhD, University of Virginia, 1968
- Linnell, Charles C.**, *Associate Professor, Teacher Education*. BS, 1976, MA, 1983, Appalachian State University; EdD, North Carolina State University, 1991
- Linville, Dale E.**, *Professor, Agricultural and Biological Engineering*. BS, Purdue University, 1962; MS, University of Connecticut, 1970; PhD, Purdue University, 1972
- Lippert, Robert M.**, *Associate Professor, Entomology, Soils, and Plant Sciences*. BA, Don Bosco College, 1976; BS, California State Polytechnic University-Pomona, 1980; PhD, University of California, 1984
- Liska, Roger W.**, *Department Chair and Professor, Construction Science and Management*. BSCE, Michigan Technological University, 1965; MSCE, Wayne State University, 1967; EdD, University of Georgia, 1988
- Littleton, Robert G.**, *Lecturer, School of Accountancy and Legal Studies*. BBA, 1953, MBA, 1954, University of Michigan, CMA
- Liu, Haibo**, *Associate Professor, Horticulture*. BS, Beijing Forestry University (China), 1982; MS, University of Illinois-Urbana-Champaign, 1988; PhD, University of Rhode Island, 1992
- Livingston, Thomas**, *Assistant Professor, Aerospace Studies; Captain U.S. Air Force*. BS, United States Air Force Academy, 1996; MBA, University of Alaska, 2000
- Lockaby, Bruce Graeme**, *Adjunct Professor, Forestry and Natural Resources*. BS, 1975, MS, 1977, Clemson University; PhD, Mississippi State University, 1981
- Locklair, Fred E.**, *Instructor, Electrical and Computer Engineering*. BS, 1980, MS, 1986, Clemson University
- Loeb, Susan C.**, *Adjunct Associate Professor, Forestry and Natural Resources; Research Ecologist*. U.S. Forest Service. AB, Stanford University, 1976; MS, 1981, PhD, 1987, University of California-Davis
- Logan, Barbara N.**, *Professor, School of Nursing*. BSN, Loyola University, 1970; MSN, University of Illinois, 1972; MA, 1978, PhD, 1980, Northwestern University
- London, James B.**, *Professor, Planning and Landscape Architecture*. BS, 1971, MA, 1974, University of South Carolina; PhD, Clemson University, 1979
- Long, Marc**, *Adjunct Professor, Bioengineering*. BS, École Nationale Supérieure D'Arts et Metier (France), 1989; MS, 1992, PhD, 1999, Clemson University
- Looney, Brian B.**, *Adjunct Professor, School of the Environment*. BS, Texas Christian University, 1978; PhD, University of Minnesota, 1983
- Lopez-Gutierrez, Edgar Rolando**, *Adjunct Assistant Professor, Entomology, Soils and Plant Sciences*. BS, Universidad del Valle de Guatemala, 1980; MS, 1988, PhD, 1995, University of Massachusetts
- Loughry, Misty L.**, *Assistant Professor, Management*. BA, Towson State University, 1986; MBA, Loyola College-Maryland, 1991; PhD, University of Florida, 2001
- Love, Gordon J.**, *Assistant Professor, Languages*. BA, University of Toronto (Canada), 1984; LLB, Queen's University-Kingston (Canada), 1987; MA, 1994, PhD, 2000, Yale University
- Lowe, Rose M.**, *Lecturer, Computer Science*. BS, Jackson State University, 1971; MA, University of Michigan, 1974; MS, Georgia Institute of Technology, 1983
- Lucas, Richard A.**, *Lecturer, Parks, Recreation, and Tourism Management*. BS, Old Dominion University, 1982; MBA, Virginia Commonwealth University, 1993
- Luo, Jian**, *Assistant Professor, Materials Science and Engineering*. BEng, Tsinghua University (China), 1994; MS, 1999, PhD, 2001, Massachusetts Institute of Technology
- Luo, Ning**, *Research Associate/Assistant Professor, Center for Advanced Engineering Fibers and Films*. BS, Xiamen University (China), 1982; MS, Chengdu University of Science and Technology (China), 1988; PhD, East China University of Science and Technology (China), 1993
- Luzinov, Igor A.**, *Assistant Professor, Materials Science and Engineering*. MS, 1985, PhD, 1990, Lviv Polytechnic Institute (Ukraine)
- Lynn, Adam J.**, *Lecturer, Mathematical Sciences*. BS, University of Massachusetts, 1998; MS, Clemson University, 2001
- Lynn, Louis B.**, *Adjunct Assistant Professor, Horticulture*. BS, 1970, MS, 1972, Clemson University; PhD, University of Maryland, 1975
- Mack, Pamela E.**, *Associate Professor, History*. AB, Harvard University, 1977; PhD, University of Pennsylvania, 1983
- Madden, Steven J.**, *Associate Professor, Communication Studies*. BA, University of South Florida, 1980; MA, New Mexico State University, 1990; PhD, University of Southern Mississippi, 1995
- Madison, Alan W.**, *Associate Professor, Computer Science*. BS, College of William and Mary, 1969; PhD, University of Virginia, 1977
- Madray, J. Russell**, *Lecturer, School of Accountancy and Legal Studies*. BS, 1986, MPAcc, 1988, Clemson University; CPA, CIA, CMA
- Maehr, David S.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, Ohio State University, 1977; MS, 1980, PhD, 1996, University of Florida
- Maertens, Thomas B., Jr.**, *Director, CAFES Development; Lecturer, Environmental Toxicology*. BS, United States Military Academy, 1970; MS, Florida Institute of Technology, 1976; MS, 1980, PhD, 1990, University of Tennessee
- Maharaj, Hiren**, *Assistant Professor, Mathematical Sciences*. BSc, 1991, BSc, 1992, BSc, 1993, PhD, 1996, University of Natal (South Africa); PhD, Pennsylvania State University, 2000
- Maher, Michael T.**, *Adjunct Professor, School of Architecture*. BS, University of Wisconsin-Milwaukee, 1985; MArch, Rice University, 1989
- Main, Doreen S.**, *Assistant Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Napier University (England), 1990; PhD, 1995, MS, 2000, University of Strathclyde (England)
- Maker, William A.**, *Department Chair and Professor, Philosophy and Religion*. BA, University of Massachusetts, 1971; MA, 1975, PhD, 1978, New School for Social Research
- Makram, Elham B.**, *SCE&G Distinguished Professor, Electrical and Computer Engineering*. BS, Assiut University (Egypt), 1969; MS, 1978, PhD, 1981, Iowa State University
- Malloy, Brian A.**, *Associate Professor, Computer Science*. BA, La Salle University, 1968; MEd, 1975, MS, 1981, PhD, 1990, University of Pittsburgh
- Maloney, Michael T.**, *Professor, Economics*. BA, Lewis College, 1970; MA, Western Illinois University, 1971; PhD, Louisiana State University, 1978
- Manley, Donald G.**, *Professor, Entomology, Soils and Plant Sciences*. BA, University of California, 1973; MA, California State University, 1975; PhD, University of Arizona, 1978
- Manson, Joseph Richard V.**, *Lecturer, Art*. MA, Clemson University, 1994; MFA, Alfred University, 1996
- Manson, Joseph R.**, *Professor, Physics and Astronomy*. BS, University of Richmond, 1965; PhD, University of Virginia, 1969
- Marcondes, Jorge A.**, *Professor, Packaging Science*. BEng, Pontificia Universidad Católica Campus (Chile), 1982; MS, 1988, PhD, 1990, Michigan State University; DfMA, Massey University (New Zealand), 1992
- Marcotte, William R., Jr.**, *Associate Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Virginia Polytechnic Institute and State University, 1980; PhD, University of Virginia, 1987
- Marcus, Richard K.**, *Professor, Chemistry*. BS, Longwood College, 1982; PhD, University of Virginia, 1986
- Marinescu, Domnitza Catalina**, *Assistant Professor, Physics and Astronomy*. BS, 1991, MS, 1991, University of Bucharest (Romania); PhD, Purdue University, 1996
- Marion, Russell A.**, *Professor, Leadership, Technology, and Counselor Education*. BA, 1967, MAT, 1968, MEd, 1976, PhD, 1976, University of North Carolina
- Marks, Steven G.**, *Professor, History*. BA, Miami University, 1980; MA, 1981, PhD, 1988, Harvard University
- Marsh, Janet G. H.**, *Research Associate/Associate Professor, Family and Neighborhood Life*. BS, Purdue University, 1970; MSW, Indiana State University, 1976; MA, 1988, PhD, 1994, University of Chicago
- Marsinko, Allan**, *Professor, Forestry and Natural Resources*. BS, 1968, MS, 1969, Purdue University; PhD, State University of New York, 1979
- Martin, Anthony Q.**, *Associate Professor, Electrical and Computer Engineering*. BS, 1980, MS, 1983, University of Mississippi; PhD, Clemson University, 1989
- Martin, Cecile L. K.**, *Lecturer, Planning and Landscape Architecture*. BS, Kutztown State University, 1969; MFA, Clemson University, 1989
- Martin, James J.**, *Assistant Professor, Computer Science*. BS, University of Illinois-Urbana-Champaign, 1983; MS, Arizona State University, 1989; PhD, North Carolina State University, 1999
- Martin, Jason K.**, *Lecturer, Mathematical Sciences*. BS, Francis Marion University, 1995; MS, Clemson University, 1999
- Martin, Michelle H.**, *Assistant Professor, English*. BA, College of William and Mary, 1988; MS, Northern Illinois University, 1991; PhD, Illinois State University, 1979
- Martin, Samuel B., Jr.**, *Professor, Entomology, Soils, and Plant Sciences*. BA, Hendrix College, 1976; MS, University of Arkansas, 1978; PhD, North Carolina State University, 1982
- Martin, Steven L.**, *Adjunct Professor, Bioengineering*. BS, Randolph-Macon College, 1980; MEd, Medical College of Virginia, 1984
- Martinez-Dawson, Rose M.**, *Lecturer, Applied Economics and Statistics*. BS, 1984, MS, 1987, MStat, 1990, North Carolina State University
- Mason, G. Patrick**, *Adjunct Associate Professor, Applied Economics and Statistics*. BA, University of Denver, 1973
- Massia, Stephen P.**, *Adjunct Professor, Bioengineering*. BS, Southwestern University, 1981; PhD, University of Texas, 1992
- Matic, Vladimir D.**, *Lecturer, Political Science*. BA, 1962, JJD, 1964, University of Belgrade (Yugoslavia)

- Matthews, Benjamin**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BS, University of Scranton, 1971; PhD, Syracuse University, 1976
- Matthews, Brent D.**, *Adjunct Assistant Professor, Bioengineering*. BA, Miami University, 1989; MD, Indiana University School of Medicine, 1993
- Matthews, Gretchen L.**, *Assistant Professor, Mathematical Sciences*. BS, Oklahoma State University, 1995; MS, 1997, PhD, 1999, Louisiana State University
- Maurice, Deniz V.**, *Professor, Animal and Veterinary Science*. BS, University of Allahabad (India), 1963; MS, University of Reading (England), 1966; PhD, University of Georgia, 1978
- May, Todd G.**, *Professor, Philosophy and Religion*. BA, Brown University, 1978; MA, Duquesne University, 1982; PhD, Pennsylvania State University, 1989
- Mayo, Rachel M.**, *Associate Professor, Public Health Sciences*. BS, 1991, MA, 1993, University of Arkansas; PhD, University of South Carolina, 1997
- Mayo, William W.**, *Coordinator of Community Health Improvement, Joseph F. Sullivan Center; Lecturer, School of Nursing*. BA, University of Arkansas, 1993; MPH, University of South Carolina, 1996
- McCall, Len C.**, *Assistant Director, University Center; Lecturer, English*. BA, Furman University, 1975; MA, Clemson University, 1986; PhD, University of South Carolina, 1990
- McCarty, Lambert B.**, *Professor, Horticulture*. BS, Clemson University, 1981; MS, North Carolina State University, 1983; PhD, Clemson University, 1986
- McCaslik, Von H.**, *Department Head, Pesticide Regulation; Lecturer, Entomology*. BS, Western Carolina University, 1965; MS, 1967, PhD, 1973, Clemson University
- McCleskey, Sarah E.**, *Assistant Librarian, Cooper Library; Branch Head, Ginnin Library*. AB, Randolph-Macon College, 1987; MA, 1991, MSLS, 1997, University of North Carolina
- McCormick, Robert E.**, *Professor, Economics*. BB&T Scholar BA, 1972, MA, 1974, Clemson University; PhD, Texas A&M University, 1978
- McCreadie, John W.**, *Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences*. BS, University of Guelph (Canada), 1980; MS, 1984, PhD, 1991, Memorial University of Newfoundland (Canada)
- McCubbin, James A.**, *Department Chair and Professor, Psychology*. BA, University of North Carolina, 1974; MA, Wake Forest University, 1976; PhD, University of North Carolina, 1980
- McCurley, Marsha J.**, *Librarian, Cooper Library; Head of Cataloging Unit*. BA, University of Georgia, 1973; MLS, George Peabody College for Teachers, 1974
- McCutcheon, Gloria S.**, *Professor, Entomology, Soils, and Plant Sciences, Coastal Research and Education Center*. BS, 1973, MS, 1978, Clemson University; PhD, University of Georgia, 1987
- McDonald, Jessyna M.**, *Associate Dean and Program Director, Economic and Community Development; Associate Professor, Parks, Recreation, and Tourism Management*. BA, University of Maryland, 1971; EDM, Temple University, 1976; PhD, University of Maryland, 1981
- McDonell, James R.**, *Associate Professor, Family and Neighborhood Life*. BA, Methodist College, 1971; MSW, University of North Carolina, 1978; DSW, Columbia University, 1987
- McElreath, Robert B., Jr.**, *Department Chair and Professor, Finance*. BS, Georgia Institute of Technology, 1962; MBA, 1968, PhD, 1976, Georgia State University
- McGee, Norman A.**, *Jr., Adjunct Assistant Professor, Parks, Recreation, and Tourism Management*. BS, Western Michigan University, 1977; JD, University of Georgia, 1981
- McGee, Philip H.**, *Assistant Professor, Leadership, Technology, and Counselor Education*. BA, Wofford College, 1971; MEd, University of Miami, 1973; MS, 1979, EdD, 1978, Indiana University
- McGregor, John D.**, *Associate Professor, Computer Science*. BS, 1970, MA, 1971, PhD, 1976, Vanderbilt University
- McGregor, John U.**, *Department Chair and Professor, Food Science and Human Nutrition*. BS, Clemson University, 1982; MS, Louisiana State University, 1984; PhD, Mississippi State University, 1988
- McGuire, Francis A.**, *Alumni Professor, Parks, Recreation, and Tourism Management*. BA, Cornell University, 1973; MS, Pennsylvania State University, 1975; PhD, University of Illinois, 1979
- McIntyre, Dwight D.**, *Assistant Professor, School of Accountancy and Legal Studies*. BBA, 1991, MAcc, 1992, University of Georgia; MBA, University of Central Florida, 1996; PhD, University of Kentucky, 2001; CPA
- McKale, Donald M.**, *Class of '41 Memorial Professor of History*. BS, Iowa State University, 1966; MA, University of Missouri, 1967; PhD, Kent State University, 1970
- McKenzie, Mary A.**, *Lecturer, English*. BA, Pfeiffer University, 1964; MA, Virginia Polytechnic Institute and State University, 1972; MEd, Clemson University, 1987
- McKnew, Judith L.**, *Lecturer, Management*. BS, 1981, MS, 1986, PhD, 1994, Clemson University
- McKnew, Mark A.**, *Associate Dean, International Programs and Services; Professor, Management*. BS, 1971, MA, 1975, University of California; PhD, Massachusetts Institute of Technology, 1978
- McMahan, Gary L.**, *Adjunct Associate Professor, Applied Economics and Statistics*. BA, Wofford College, 1968; MPA, University of South Carolina, 1981
- McMillan, Jeffrey J.**, *Professor, School of Accountancy and Legal Studies*. BS, 1983, MBA, 1984, Louisiana State University; PhD, University of South Carolina, 1990
- McMillan, Kerri D.**, *Lecturer, Finance*. BS, Southeastern Louisiana University, 1981; MBA, University of South Carolina, 1988
- McNair, Jonda Cecole**, *Assistant Professor, Teacher Education*. BA, 1992, MEd, 1994, University of Florida; PhD, Ohio State University, 2003
- McNeice, Gregory M.**, *Adjunct Professor, Bioengineering; Associate Professor, Reproductive Endocrinology, Greenville Hospital System*. BASC, University of Waterloo (Canada), 1964; PhD, University of London (England), 1968
- McNeill, Jason D.**, *Assistant Professor, Chemistry*. BS, Northern Illinois University, 1991; PhD, University of California-Berkeley, 1999
- McNulty, Peter J.**, *Professor, Physics and Astronomy*. BS, Fordham University, 1962; PhD, State University of New York, 1965
- McNutt-Scott, Tamara L.**, *Lecturer, Biological Sciences*. BS, Clarion University, 1983; MS, Kent State University, 1985; PhD, Pennsylvania State University, 1990
- Meehan, Nancy K.**, *Associate Professor, School of Nursing*. BSN, Medical University of South Carolina, 1978; MSN, 1981, PhD, 1985, University of Texas
- Meier, Markus**, *Visiting Assistant Professor, Mechanical Engineering*. BS, 1981, PhD, 1985, Swiss Federal Institute of Technology (Switzerland)
- Melba, Kay M.**, *Adjunct Assistant Professor, School of Nursing*. BS, Marshall University, 1981; MS, West Virginia University, 1984
- Melloy, Brian J.**, *Associate Professor, Industrial Engineering*. BSE, 1978, MSIE, 1981, PhD, 1986, University of South Florida
- Melshmeier, Stephen S.**, *Associate Dean, College of Engineering and Science; Professor, Chemical Engineering*. BS, Louisiana State University, 1965; PhD, Tulane University, 1969
- Melton, Gary B.**, *Professor, Family and Neighborhood Life*. BA, University of Virginia, 1973; MA, 1975, PhD, 1978, Boston University
- Melton, Judith Mary**, *Associate Dean of Academic Affairs, College of Architecture, Arts, and Humanities; Professor, Languages*. BA, 1963, MA, 1966, PhD, 1972, Louisiana State University
- Meriwether, John W., Jr.**, *Professor, Physics and Astronomy*. BS, Massachusetts Institute of Technology, 1964; PhD, University of Maryland, 1970
- Metters, Andrew T.**, *Assistant Professor, Chemical Engineering*. BS, North Carolina State University, 1994; MS, 1996, PhD, 2000, University of Colorado-Boulder
- Meyer, Bradley S.**, *Professor, Physics and Astronomy*. BA, Rice University, 1983; PhD, University of Chicago, 1989
- Meyer, Kathleen M.**, *Lecturer, Public Health Sciences*. BS, 1977, MS, 1982, State University of New York-Cortland
- Michaelis, Ron C.**, *Adjunct Assistant Professor, Genetics, Biochemistry, and Life Science Studies*. PhD, Vanderbilt University, 1983
- Mickelsen, Patricia Audrey**, *Lecturer, Biological Sciences*. PhD, University of North Carolina, 1981
- Mihelich, John L.**, *Adjunct Assistant Professor, Materials Science and Engineering*. BS, 1959, MS, 1961, PhD, 1964, Case Institute of Technology
- Mikhailova, Elena**, *Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences*. BA, Moscow State Pedagogical University (Russia), 1992; MS, 1995, PhD, 1999, Cornell University
- Millar, Heber W.**, *Director, Teacher Education*. BS, Indiana University, 1975; MEd, University of Texas, 1985
- Miller, James A.**, *Associate Professor, History*. BA, State University of New York-Binghamton, 1969; MA, 1972, PhD, 1981, University of Texas-Austin
- Miller, Janis L.**, *Associate Professor, Management*. BS, 1978, MBA, 1986, PhD, 1990, University of Missouri
- Miller, Karl V.**, *Adjunct Associate Professor, Forestry and Natural Resources*. BS, Pennsylvania State University, 1979; MS, Ohio State University, 1981; PhD, University of Georgia, 1985
- Miller, Richard S.**, *Assistant Professor, Mechanical Engineering*. BS, 1992, MS, 1993, PhD, 1995, State University of New York-Buffalo
- Miller, Robert J.**, *Associate Professor, School of Architecture; Director, Charleston Center*. BA, Clemson University, 1976; MArch, Rice University, 1979
- Miller, Stephen E.**, *Professor, Applied Economics and Statistics*. BS, North Carolina State University, 1972; PhD, Virginia Polytechnic Institute and State University, 1977
- Mills, Gary L.**, *Adjunct Assistant Professor, School of the Environment*. BS, Southern Connecticut State University, 1975; PhD, University of Rhode Island, 1981
- Minor, V. Christine M.**, *Lecturer, Genetics, Biochemistry, and Life Science Studies*. BS, University of South Carolina, 1991; MS, Iowa State University, 1997
- Mitchell, Paula L.**, *Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences*. BA, University of Pennsylvania, 1973; PhD, University of Texas, 1980
- Mitchiner, Matthew D.**, *Assistant Professor, Military Leadership; Captain U. S. Army*. BS, University of South Carolina, 1995
- Mittelstaedt, John D.**, *Associate Professor, Marketing*. BA, Saint Olaf College, 1986; MTS, Harvard University, 1989; PhD, University of Iowa, 1995
- Moble, E. Catherine**, *Associate Professor, Sociology*. BA, Clemson University, 1984; MS, University of Bath (England), 1990; PhD, University of Maryland, 1996
- Moise, Edwin E.**, *Professor, History*. BA, Harvard University, 1967; MA, 1972, PhD, 1977, University of Michigan
- Moline, David C.**, *Lecturer, Mechanical Engineering*. BS, Bob Jones University, 1991; MS, Clemson University, 1994

- Molnar, Peter**, Research Associate/Assistant Professor, Bioengineering. BS, 1989, PhD, 1992, Eotvos Lorand University (Hungary)
- Mole, Fred J. III**, Distinguished Scientist and Professor, School of the Environment. BS, 1966, MS, 1968, Drexel University; PhD, Stanford University, 1970
- Montanucci, Richard R.**, Associate Professor, Biological Sciences. BS, University of California, 1967; MA, 1969, PhD, 1972, University of Kansas
- Mooney, Franklin K., Sr.**, Visiting Associate Professor, School of Architecture. BArch, Clemson University, 1962; MArch, Yale University, 1963
- Moore, Bradley S.**, Assistant Professor, Military Leadership; Captain U.S. Army. BA, Furman University, 1994
- Moore, Brandon D.**, Assistant Professor, Genetics, Biochemistry, and Life Science Studies. BA, University of Colorado, 1977; MS, Arizona State University, 1980; PhD, Washington State University, 1986
- Moore, D. Dewayne**, Professor, Psychology. BA, North Texas State University, 1974; MA, 1977, PhD, 1979, Michigan State University
- Moore, Jesse N.**, Associate Professor, Marketing. BS, University of Richmond, 1981; MBA, Northern Arizona University, 1992; PhD, University of South Florida, 1997
- Morgan, Angela G.**, Assistant Professor, Finance. BS, Clemson University, 1993; MBA, 1994, PhD, 1999, University of Georgia
- Morris, James C.**, Assistant Professor, Genetics, Biochemistry, and Life Science Studies. BS, College of William and Mary, 1990; MS, 1993, PhD, 1997, University of Georgia
- Morris, Keith L.**, Assistant Professor, English. BA, 1992, MA, 1994, University of Idaho; MFA, University of North Carolina-Greensboro, 1996
- Morris, Michael A.**, Professor, Political Science. BA, Southern Illinois University, 1962; MA, Middlebury College, 1963; MA, 1965, PhD, 1971, Johns Hopkins University
- Morrissey, Lee J.**, Associate Professor, English. AB, Boston College, 1986; MA, 1988, MA, 1990, MPhil, 1992, PhD, 1995, Columbia University
- Morse, John C.**, Professor, Entomology, Soils, and Plant Sciences. BS, Davidson College, 1968; MS, Clemson University, 1970; PhD, University of Georgia, 1974
- Morton, Deborah Balchiser**, Assistant Professor, English. BA, Western Illinois University, 1992; MS, 1994, PhD, 2003, Illinois State University
- Moss, William F.**, Professor, Mathematical Sciences. BS, Massachusetts Institute of Technology, 1966; PhD, University of Delaware, 1974
- Mount, Andrew S.**, Lecturer, Biological Sciences. BS, University of Tampa, 1980; MS, College of Charleston, 1991; PhD, Clemson University, 1999
- Mousseau, Timothy**, Adjunct Associate Professor, Entomology, Soils, and Plant Sciences. BS, University of Ottawa (Canada), 1980; MS, University of Toronto (Canada), 1983; PhD, McGill University (Canada), 1988
- Mowrey, Megan E.**, Assistant Professor, School of Accountancy and Legal Studies. BA, 1985, JD, 1988, PhD, 1998, University of Iowa
- Moyle, David D.**, Lecturer, Physics and Astronomy. BS, Wilkes College, 1964; PhD, Rensselaer Polytechnic Institute, 1969
- Mueller, John D.**, Professor, Entomology, Soils, and Plant Sciences, Edisto Research and Education Center. BS, University of Missouri, 1978; MS, 1981, PhD, 1983, University of Illinois
- Mulligan, Casey B.**, Visiting Professor, Economics. BA, Harvard University, 1991; PhD, University of Chicago, 1993
- Munson, Priscilla C.**, Associate Librarian, Cooper Library. BA, Indiana University, 1972; MLS, University of South Carolina, 1983
- Murdoch, Janice W.**, Associate Dean, College of Business and Behavioral Science, Professor, Psychology. BA, 1980, MA, 1982, Wake Forest University; PhD, Vanderbilt University, 1985
- Murdoch, Lawrence C.**, Associate Professor, School of the Environment. BS, Pennsylvania State University, 1980; MS, 1987, PhD, 1991, University of Cincinnati
- Murr, Kenneth R.**, Librarian, Cooper Library. BA, Maryville College, 1972; MS, 1974, MSLS, 1975, University of Tennessee
- Murray, Peter M.**, Adjunct Associate Professor, Bioengineering. BA, West Virginia University, 1981; MD, West Virginia School of Medicine, 1985
- Muth, Eric R.**, Associate Professor, Psychology. BA, Hartwick College, 1991; MS, 1993, PhD, 1997, Pennsylvania State University
- Mwinyelle, Jerome B.**, Lecturer, Languages. BA, University of Ghana (Ghana), 1989; MA, Temple University, 1995
- Nadenicek, Daniel J.**, Department Chair and Professor, Planning and Landscape Architecture. BS, 1973, MS, 1976, Mankato State University; BLA, 1991, MLA, 1991, University of Minnesota
- Nakama, Constancio K.**, Department Chair and Professor, Languages. BA, University of Ghana (Ghana), 1982; MA, University of Paris (France), 1984; PhD, Sorbonne Nouvelle-University of Paris (France), 1990; MA, Saint Mary's University (Canada), 1991
- Nash, Charles A.**, Adjunct Assistant Professor, School of the Environment. BChE, University of Delaware, 1981; MS, 1984, PhD, 1986, University of Illinois
- Nault, Eleanor W.**, Director, Assessment; Lecturer, Leadership, Technology, and Counselor Education. PhD, Clemson University, 1996
- Navratil, James D.**, Professor, School of the Environment. BA, 1970, MS, 1972, PhD, 1975, University of Colorado-Boulder
- Neal, Jerome M.**, Visiting Assistant Professor, Leadership, Technology, and Counselor Education; Adjunct Assistant Professor, School of Nursing. BS, Samford University, 1965; MDiv, Southern Seminary, 1968; MS, 1968, EdD, 1971, Indiana University
- Neal, Michael R.**, Assistant Professor, English. BA, Taylor University, 1993; MA, Ball State University, 1994; PhD, University of Louisville, 2001
- Neal, Patrick Claiborne**, Lecturer, English. BA, 1992, MA, 1994, University of Georgia
- Nelson, Eric A.**, Adjunct Professor, Forestry and Natural Resources. BA, Occidental College, 1971; MS, 1974, PhD, 1978, Oregon State University
- Nelson, Larry R.**, Associate Professor, Forestry and Natural Resources. BS, Ohio University, 1972; MF, Duke University, 1974; PhD, Auburn University, 1987
- Nelson, Peter R.**, Professor, Mathematical Sciences. BS, Case Institute of Technology, 1971; MS, 1973, PhD, 1975, Case Western Reserve University
- Nettles, William C., Jr.**, Adjunct Professor, Entomology, Soils, and Plant Sciences. BS, 1955, MS, 1959, Clemson University; PhD, Rutgers University, 1962
- Newkirk, Gary L.**, Lecturer, Management. BS, United States Naval Academy, 1966; MBA, University of Virginia, 1976; EdD, Clemson University, 1992
- Nghiem, Nhuan Phu**, Adjunct Professor, Agricultural and Biological Engineering. BS, 1975, MS, 1977, University of New South Wales (Australia); PhD, Louisiana State University and Agricultural and Mechanical College, 1982
- Nicholas, David M., Jr.**, Kathryn and Calhoun Lemon Professor, History. BA, University of North Carolina, 1961; MA, University of California-Berkeley, 1963; PhD, Brown University, 1967
- Nichols, John E., Jr.**, Adjunct Assistant Professor, Biological Sciences. BS, Columbus University, 1981; MD, Medical College of Georgia, 1988
- Nilson, Linda B.**, Director, Teaching Effectiveness and Innovations, Lecturer, Sociology. BA, University of California-Berkeley, 1970; Ms, 1972, PhD, 1974, University of Wisconsin
- Nix, Lawrence E.**, Professor, Forestry and Natural Resources. BS, 1968, MS, 1970, Mississippi State University; PhD, University of Georgia, 1974
- Nix, P. Marie**, Lecturer, College of Business and Behavioral Science Undergraduate Advising Center. BA, University of North Carolina, 1990; MS, 1996, PhD, 2002, University of Georgia
- Noels, Barry C.**, Associate Dean of Research, College of Architecture, Arts, and Humanities, Professor, City and Regional Planning. BS, Cornell University, 1969; MPl, 1972, PhD, 1978, University of North Carolina; ACIP
- Noneaker, Daniel L.**, Associate Professor, Electrical and Computer Engineering. BS, Auburn University, 1977; MS, Emory University, 1979; MS, Georgia Institute of Technology, 1984; PhD, University of Illinois, 1993
- Norman, Richard B.**, Professor, School of Architecture. BS, Lawrence University, 1955; BArch, University of Illinois-Urbana-Champaign, 1958; MArch, University of Michigan, 1961; AIA
- Norman, William C.**, Associate Professor, Parks, Recreation, and Tourism Management. BS, University of Minnesota, 1980; MS, Michigan State University, 1987; MPl, University of Minnesota, 1995
- Norsworthy, Jason K.**, Assistant Professor, Entomology, Soils and Plant Sciences. BS, Louisiana Technical University, 1995; MS, 1997, PhD, 2000, University of Arkansas
- Nortcliff, Stephen**, Adjunct Professor, Entomology, Soils, and Plant Sciences. BA, University of Bristol (England), 1969; PhD, University of East Anglia (England), 1974
- Novick, Beth A.**, Visiting Assistant Professor, Mathematical Sciences. BS, Barnard College, 1972; MS, University of Colorado, 1984; MS, 1987, PhD, 1990, Carnegie Mellon University
- Nowack, Robert E.**, Alumni Professor, Civil Engineering. BS, Carnegie Mellon University, 1948; MS, University of Pittsburgh, 1952; LLD, Clemson University, 1999
- Nyankori, James C. O.**, Professor, Applied Economics and Statistics. BS, Makerere University (Kampala) (Uganda), 1968; MS, Ohio State University, 1970; PhD, University of Illinois, 1977
- Nycepey, Andrew P.**, Adjunct Professor, Entomology, Soils, and Plant Sciences. BSA, University of Georgia, 1974; MS, 1976, PhD, 1980, Clemson University
- Oberdan, Thomas J.**, Associate Professor, Philosophy and Religion. BA, University of Missouri-Saint Louis, 1972; AM, 1975, AM, 1976, PhD, 1990, Indiana University
- O'Callaghan, Deaig P.**, Adjunct Professor, Forestry and Natural Resources. BS, 1973, PhD, 1977, University of Dublin (Ireland)
- Ochterbeck, Jay M.**, Associate Professor, Mechanical Engineering. BS, 1987, MS, 1990, PhD, 1993, Texas A&M University
- Ogale, Amod A.**, Professor, Chemical Engineering. BT, Indian Institute of Technology (India), 1982; PhD, University of Delaware, 1986
- Ogg, Neil**, Director, Regulatory and Public Services Programs. BS, East Tennessee State University, 1974; MS, University of Tennessee, 1975; EdD, Clemson University, 1992
- O'Hara, Liam H.**, Lecturer, Graphic Communications. BA, University of Georgia, 1986; MAT, University of South Carolina, 1989; MInEd, Clemson University, 1997
- Ohland, Matthew W.**, Assistant Professor, General Engineering. BA, BS, Swarthmore College, 1989; MS, 1991, MS, 1992, Rensselaer Polytechnic Institute; PhD, University of Florida, 1996

- Oka, Yukari**, Cecil Lecturer in Architecture, School of Architecture, BS, University of Tokyo (Japan), 1990; MA, Polytechnic of North London, 1991; PhD, University of Tokyo (Japan), 1995
- Okofo, Chinyelu B.**, Assistant Professor, Public Health Sciences, BS, University of Ibadan (Nigeria), 1976; MS, 1978, PhD, 1981, University of Wisconsin
- Okofo, Nduka**, Adjunct Assistant Professor, Biological Sciences, BS, University College (Nigeria), 1960; PhD, University of Cambridge (England), 1964
- Oliver, Garth R.**, Instructor, Graphic Communications, BS, Southeast Missouri State University, 1994; MA, Gonzaga University, 1997
- Olson, Larry W.**, Associate Professor, Animal and Veterinary Sciences, Edisto Research and Education Center, BS, Oklahoma State University, 1971; MS, 1974, PhD, 1976, University of Nebraska
- Olson, Laura R.**, Associate Professor, Political Science, BA, Northwestern University, 1990; MA, 1991, PhD, 1996, University of Wisconsin-Madison
- O'Sullivan, Sean L.**, Assistant Professor, English, BA, Princeton University, 1988; BA, University of Bristol (England), 1990; MA, 1995; MF, 1998, PhD, 2000, Yale University
- Oris, David L.**, Adjunct Professor, Biological Sciences, BS, 1971, MS, 1974, PhD, 1976, Colorado State University
- Overcamp, Thomas J.**, Professor, School of the Environment, BS, Michigan State University, 1968; MS, 1970, PhD, 1973, Massachusetts Institute of Technology; PE
- Owens, Emma M.**, Associate Professor, Teacher Education, BS, Morris College, 1963; MS, George Washington University, 1972; EdD, Clemson University, 1986
- Owino, Tom O.**, Assistant Professor, Agricultural and Biological Engineering, BS, University of Nairobi (Kenya), 1985; MS, University of Alberta (Canada), 1993; PhD, Pennsylvania State University, 1999
- Pace, Thomas B.**, Adjunct Assistant Professor, Bioengineering, BS, Mississippi State University, 1978; MD, University of Mississippi, 1982
- Pagano, Christopher C.**, Associate Professor, Psychology, BA, 1987, PhD, 1993, University of Connecticut
- Page, Edward W. III**, Director, Office of Technology Transfer, Professor, Computer Science, BS, Clemson University, 1965; MS, University of Alabama, 1968; PhD, Duke University, 1973
- Paige, William D.**, Professor, Leadership, Technology, and Counselor Education, BS, 1968, MS, 1972, State University of New York-Oswego; PhD, Ohio State University, 1978
- Palmer, Ammon H.**, Assistant Professor, Aerospace Studies; Captain U.S. Air Force, BS, Clemson University, 1991; MBS, West Coast University, 1996
- Palmer, Jacqueline M.**, Adjunct Assistant Professor, Biological Sciences, BS, 1982, MS, 1984, Western Carolina University; AM, 1988, PhD, 1991, Harvard University
- Palmer, R. Barton**, Cathoon Lemon Professor, Literature, BA, Dartmouth College, 1968; BA, University of Durham (England), 1970; MPhil, 1972, PhD, 1974, Yale University; MA, 1984, PhD, 1989, New York University
- Pargas, Roy P.**, Associate Professor, Computer Science, BS, Ateneo De Manila University (Philippines), 1971; MS, 1981, PhD, 1982, University of North Carolina
- Park, Chansok**, Assistant Professor, Mathematical Sciences, BS, Seoul National University (Korea), 1987; MS, Korea Advanced Institute of Science and Technology (Korea), 1989; MA, University of Texas-Austin, 1994; PhD, Pennsylvania State University, 2000
- Park, Hyun Jin**, Adjunct Associate Professor, Packaging Science, BS, 1983, MS, 1985, Korea University (Korea); PhD, University of Georgia, 1991
- Park, Lauretta L.**, Associate Professor, Psychology, BA, Muskingum College, 1969; MS, 1971, PhD, 1972, Florida State University
- Park, William J., Jr.**, Associate Professor, General Engineering, BS, 1978, MS, 1981, PhD, 1986, Clemson University
- Parker, Charles R.**, Adjunct Associate Professor, Entomology, Soils, and Plant Sciences, BS, 1973, MS, 1976, George Mason University; PhD, Virginia Polytechnic Institute and State University, 1980
- Parker, Veronica G.**, Associate Professor, School of Nursing, BS, College of Charleston, 1984; BS, Clemson University, 1986; PhD, Medical University of South Carolina, 1994
- Parker, William M.**, Assistant Professor, Military Leadership; Captain U.S. Army, BS, United States Military Academy, 1995; MA, Webster University, 1999
- Parnell, Pamela G.**, Lecturer, Livestock and Poultry Health, BS, Wofford College, 1983; DVM, 1987, PhD, 1993, University of Georgia
- Parrot, Charles T.**, Lecturer, Communication Studies, BA, Hastings College, 2000; MA, Ball State University, 2002
- Parrott, Timothy**, Lecturer, Mathematical Sciences, BS, 1998, MS, 1998, Clemson University
- Parsons, Caroline S.**, Lecturer, Communication Studies, BA, University of Alabama, 1994; MA, Ball State University, 1995
- Pass, Susan J.**, Assistant Professor, Teacher Education, BS, Georgetown University, 1966; MEd, Western Illinois University, 1986; EdD, University of Houston, 1999
- Paton, Peter**, Adjunct Assistant Professor, Biological Sciences, BS, Lewis and Clark College, 1978; MS, Colorado State University, 1985; PhD, Utah State University, 1994
- Patterson, Gordon W.**, Associate Professor, School of Architecture, BA, 1965, BArch, 1965, University of Arkansas; MArch, Clemson University, 1974
- Patterson, James W.**, Professor, Management, BS, 1970, MA, 1971, PhD, 1977, University of Arkansas
- Paul, Catherine E.**, Associate Professor, English, BA, University of North Carolina, 1993; MA, 1995, PhD, 1998, University of Michigan
- Paul, Frank W.**, McQueen Quattlebaum Professor, Mechanical Engineering, BS, 1960, MS, 1964, Pennsylvania State University; PhD, Lehigh University, 1968, PE
- Pavlaske, Stephen J.**, Lecturer, Applied Economics and Statistics, BS, Clemson University, 1967
- Payne, James E.**, Adjunct Professor, Physics and Astronomy, BS, Hampden-Sydney College, 1966; MS, 1969, PhD, 1971, Clemson University
- Paynter, Malcolm J. B.**, Professor, Biological Sciences, BSc, 1959, MSc, 1962, PhD, 1964, Sheffield University (England)
- Paynter, Valerie A.**, Adjunct Professor, Entomology, Soils, and Plant Sciences, BS, University of London (England), 1957; PhD, Clemson University, 1975
- Pearlstone, David B.**, Adjunct Assistant Professor, Bioengineering, BS, Vanderbilt University, 1984; MD, New York University School of Medicine, 1989
- Pearson, L. Wilson**, Professor, Electrical and Computer Engineering, BSEE, 1968, MS, 1973, University of Mississippi; PhD, University of Illinois, 1976
- Pedrick, Suzanne M.**, Lecturer, Professional Services; Occupational Health Nurse, BS, Clemson University, 1994
- Peeler, David K.**, Adjunct Assistant Professor, Materials Science and Engineering, BS, Clemson University, 1987; MS, Alfred University, 1989, PhD, Clemson University, 1993
- Pellerin, Carolyn E.**, Lecturer, Computer Science, BS, North Georgia College and State University, 1968; MS, Clemson University, 1970
- Pennington, William T., Jr.**, Professor, Chemistry, BA, Hendrix College, 1977; PhD, University of Arkansas, 1983
- Peppers, Larry G.**, Associate Professor, Sociology, BS, 1969, MA, 1971, Memphis State University; PhD, Oklahoma State University, 1973
- Perahia, Dvora**, Associate Professor, Chemistry, BSc, Hebrew University of Jerusalem (Israel), 1981; MSc, 1984, PhD, 1990, Weizmann Institute of Science (Israel)
- Perdue, Richard R.**, Adjunct Instructor, Food Science and Human Nutrition, BS, University of Georgia, 1954
- Peters, Chris L.**, Associate Professor, Teacher Education, BA, 1978, MEd, 1983, Clemson University; EdD, University of Georgia, 1988
- Peterson, James K.**, Associate Professor, Mathematical Sciences, BA, Indiana University, 1975; MS, 1977, PhD, 1980, Colorado State University
- Pettigrew, Charles A., Jr.**, Adjunct Professor, Biological Sciences, BS, Erskine College, 1981; MS, Clemson University, 1984; PhD, University of Tennessee, 1988
- Pickett, Gregory M.**, Department Chair and Professor, Marketing, BS, 1979, MBA, 1983, PhD, 1985, Oklahoma State University
- Pierce, Todd J.**, Assistant Professor, English, BA, Southern California College, 1988; MA, Oregon State University, 1992; MFA, University of California, 1995; PhD, Florida State University, 2002
- Pilcher, June J.**, Associate Professor, Psychology, BA, University of Southern Mississippi, 1984; MA, 1989, PhD, 1989, University of Chicago
- Pinkerton, Bruce W.**, Associate Dean, College of Agriculture, Forestry, and Life Sciences, Professor, Entomology, Soils, and Plant Sciences, BA, Southwest Texas State University, 1971; MS, 1976, PhD, 1982, Texas A&M University
- Piper, Christine A.**, Associate Professor, Construction Science and Management, BS, 1986, MBMS, 1988, Clemson University
- Pivorun, Edward B.**, Professor, Biological Sciences, BS, Tufts University, 1968; PhD, University of Minnesota, 1973
- Placone, Dennis L.**, Professor, Economics, BA, 1970, MA, 1972, PhD, 1982, University of Pittsburgh
- Poole, Kelvin E.**, Professor, Electrical and Computer Engineering, BS, 1964, MS, 1966, University of Natal (South Africa); PhD, Victoria University of Manchester (England), 1969
- Pope, Amy Liann**, Lecturer, Physics and Astronomy, BS, 1997, MS, 1999, PhD, 2002, Clemson University
- Porcher, F. Cordes, Jr.**, Adjunct Lecturer, Graphic Communications, BS, 1988, MEd, 1992, Clemson University
- Porcher, Richard D.**, Adjunct Professor, Biological Sciences, BS, College of Charleston, 1962; MS, 1966, PhD, 1974, University of South Carolina
- Porter, Nancy M.**, Professor, Family and Community Studies, BS, 1974, MS, 1985, Mansfield State College; PhD, Virginia Polytechnic Institute and State University, 1990
- Post, Christopher J.**, Assistant Professor, Forestry and Natural Resources, BA, Reed College, 1990; MS, 1995, PhD, 2001, Cornell University
- Post, Daniel**, Adjunct Professor, Mechanical Engineering, BS, 1950, MS, 1951, PhD, 1957, University of Illinois-Urbana-Champaign
- Potts, Thomas D.**, Associate Professor, Parks, Recreation, and Tourism Management, Strom Thurmond Institute, BS, Florida State University, 1975; MS, University of Southern Mississippi, 1979; PhD, Texas A&M University, 1985
- Powell, Gary L.**, Professor, Genetics, Biochemistry, and Life Science Studies, BS, University of California, 1962; PhD, Purdue University, 1967
- Powell, John Mark**, Lecturer, English, BA, The Citadel, 1997; MFA, University of South Carolina, 2001
- Prater, Mary Ann M.**, Lecturer, School of Accountancy and Legal Studies, BS, 1978, MS, 1983, Clemson University; CPA

- Prevost, Shari A.**, *Lecturer, Mathematical Sciences*. BS, University of Florida, 1982; PhD, Rutgers University, 1989
- Price, Vaneaton, Jr.**, *Adjunct Associate Professor, School of the Environment*. BS, University of South Carolina, 1962; MS, 1967, PhD, 1969, University of North Carolina
- Prowell, David C.**, *Adjunct Assistant Professor, School of the Environment*. BS, 1971, MS, 1972, Emory University; PhD, University of California-Santa Cruz, 1974
- Pruitt, James R.**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BS, The Citadel, 1960; MD, Medical University of South Carolina, 1960
- Pruitt, Rosanne H.**, *Professor, School of Nursing*. BSN, Emory University, 1974; MN, University of South Carolina, 1979; PhD, University of Maryland, 1989
- Przirembel, Christian E. G.**, *Vice President for Research, Professor, Mechanical Engineering*. BS, 1963, MS, 1964, PhD, 1967, Rutgers University
- Ptacek, Margaret**, *Associate Professor, Biological Sciences*. BS, 1981, MS, 1984, Emporia State University; PhD, University of Missouri-Columbia, 1991
- Pursley, Michael B.**, *Holcombe Professor, Electrical and Computer Engineering*. BS, 1967, MS, 1968, Purdue University; PhD, University of Southern California, 1974
- Purvis, Russell L.**, *Associate Professor, Management*. BS, University of Miami, 1980; MBA, Georgia State University, 1985; PhD, Florida State University, 1994
- Pury, Cynthia L. S.**, *Associate Professor, Psychology*. BA, University of Wisconsin, 1989; MS, 1991, PhD, 1997, Northwestern University
- Qazi, Javaid I.**, *Research Associate/Assistant Professor, Materials Science and Engineering*. BS, Middle East Technical University (Turkey), 1995; PhD, University of Idaho, 2001
- Queen, William G.**, *University Veterinarian, Research Services; Lecturer, Animal and Veterinary Sciences*. DVM, Ohio State University, 1978
- Quisenberry, Virgil L.**, *Professor, Entomology, Soils, and Plant Sciences*. BS, 1969, MS, 1970, PhD, 1974, University of Kentucky
- Rack, Henry J.**, *Professor, Materials Science and Engineering*. BS, 1964, MS, 1965, ScD, 1968, Massachusetts Institute of Technology
- Rael, Ronald L.**, *Assistant Professor, School of Architecture*. BED, University of Colorado-Boulder, 1994; MArch, Columbia University, 1998
- Rahn, Christopher D.**, *Adjunct Associate Professor, Mechanical Engineering; Adjunct Associate Professor, Electrical and Computer Engineering*. BS, University of Michigan, 1985; MS, 1986, PhD, 1992, University of California-Berkeley
- Raj, Christina D.**, *Lecturer, Communication Studies*. BA, 1999, MA, 2001, Bob Jones University
- Rajapakse, Nihal C.**, *Research Associate/Professor, Horticulture*. BS, University of Peradeniya (Sri Lanka), 1981; MS, 1983, PhD, 1986, Texas A&M University
- Ramamurthi, Anand**, *Assistant Professor, Bioengineering*. BE, Bangalore University (India), 1994; MS, 1996, PhD, 1999, Oklahoma State University
- Ramirez, Barbara J.**, *Lecturer, English*. BA, 1979, MA, 1982, Clemson University
- Rangaraju, Prasad Rao**, *Assistant Professor, Civil Engineering*. BTech, Jawaharlal Nehru Technological University (India), 1991; MS, Iowa State University, 1993; PhD, Purdue University, 1997
- Ransom, Bruce W. II**, *Professor, Political Science*. BA, Hampton Institute, 1971; MA, 1974, PhD, 1981, University of Virginia
- Rao, Apparao M.**, *Associate Professor, Physics and Astronomy*. BS, University of Bombay (India), 1983; MS, 1985, PhD, 1989, University of Kentucky
- Rao, Arthi V.**, *Visiting Assistant Professor, Planning and Landscape Architecture*. BArch, Bangalore University (India), 1999; MLA, Pennsylvania State University, 2002
- Rash, Dan R.**, *Professor, Performing Arts, Director of Chorus*. BM, University of Texas-Arlington, 1973; MIMed, University of North Texas, 1976; DMA, University of Colorado, 1989
- Raymark, Patrick H.**, *Associate Professor, Psychology*. BS, University of Wisconsin, 1987; MS, Illinois State University, 1989; PhD, Bowling Green State University, 1993
- Raymond, Mary Anne**, *Associate Professor, Marketing*. BS, 1976, MBA, 1978, University of Alabama; PhD, University of Georgia, 1986
- Reba, Marilyn**, *Lecturer, Mathematical Sciences*. BA, Cleveland State University, 1968; MA, 1970, PhD, 1973, University of North Carolina; MS, Purdue University, 1996
- Reel, Jerome V., Jr.**, *Senior Vice Provost and Dean of Undergraduate Studies; Professor, History*. BS, 1960, MA, 1961, University of Southern Mississippi; PhD, Emory University, 1967
- Reese, Richard M.**, *Professor, Marketing*. BA, 1968, MBA, 1969, PhD, 1972, University of Texas
- Reid, James L.**, *Lecturer, Physics and Astronomy*. BS, Clemson University, 1957; MS, Georgia Institute of Technology, 1960; PhD, Clemson University, 1974
- Reid, William J. III**, *Visiting Assistant Professor, Electrical and Computer Engineering*. BS, 1988, MS, 1990, PhD, 1997, Clemson University
- Reighard, Gregory L.**, *Professor, Horticulture*. BS, Pennsylvania State University, 1977; MS, University of Michigan, 1978; PhD, Michigan State University, 1984
- Reinhold, Timothy A.**, *Professor, Civil Engineering*. BS, 1973, MS, 1975, PhD, 1977, Virginia Polytechnic Institute and State University; PE
- Reinking, David Paul**, *Named Professor, Teacher Education*. BA, Concordia Teachers College, 1971; MS, Winona State University, 1979; PhD, University of Minnesota-Twin Cities, 1983
- Reitzug, Ulrich**, *Professor, Leadership, Technology, and Counselor Education*. BA, University of Notre Dame, 1974; MS, 1980, PhD, 1987, Indiana University
- Rencke, James A.**, *Professor, Mathematical Sciences*. BA, 1958, MA, 1960, University of Florida; PhD, University of North Carolina, 1964
- Reppert, Philip M.**, *Assistant Professor, School of the Environment*. BS, Pennsylvania State University, 1980; PhD, Massachusetts Institute of Technology, 2000
- Revis-Wagner, C. Kenyon**, *Associate Professor, Genetics, Biochemistry, and Life Science Studies*. BA, Emory University, 1965; MS, 1968, PhD, 1973, University of Georgia
- Rhodehamel, E. Jeffery**, *Adjunct Assistant Professor, Food Science and Human Nutrition*. BS, 1979, MS, 1983, PhD, 1996, Virginia Polytechnic Institute and State University
- Rial, Wayne Scott**, *Adjunct Assistant Professor, Agricultural and Biological Engineering*. BS, Indiana Institute of Technology, 1954; MEng, Cornell University, 1974; PhD, Clemson University, 1999
- Riccomini, Paul J.**, *Assistant Professor, Teacher Education*. BA, 1993, MEd, 1996, Edinboro University of Pennsylvania; PhD, Pennsylvania State University, 2001
- Rice, Charles D.**, *Professor, Biological Sciences*. BS, 1980, MS, 1986, Virginia Commonwealth University; PhD, College of William and Mary, 1989
- Rice, Richard W.**, *Associate Professor, Chemical Engineering*. BS, Clemson University, 1968; MPh, 1970, MS, 1972, PhD, 1972, Yale University
- Richardson, M. Elaine**, *Director, Academic Support Center; Professor, Animal and Veterinary Sciences*. BS, Memphis State University, 1970; MS, 1976, PhD, 1986, Clemson University
- Rideout, Sandra**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BA, Ball State University, 1987; MS, 1997, PhD, 2001, Stephen F. Austin State University
- Ridgeway, Victoria G.**, *Associate Professor, Teacher Education*. BS, North Georgia College and State University, 1968; MAT, Emory University, 1969; PhD, University of Georgia, 1994
- Rieck, James R.**, *Professor, Applied Economics and Statistics*. BS, Salisbury State University, 1974; MS, 1978, PhD, 1989, Clemson University
- Riester, John B.**, *Project Manager, South Carolina Energy Research and Development Center, Lecturer, Mechanical Engineering*. BS, 1976, MS, 1977, PhD, 1983, West Virginia University
- Riley, Helene M.**, *Alumni Distinguished Professor of German Languages*. BA, University of North Texas, 1970; MA, 1973, PhD, 1975, Rice University
- Riley, Melissa B.**, *Research Associate/Professor, Entomology, Soils, and Plant Sciences*. BS, 1976, MS, 1979, PhD, 1990, Clemson University
- Fillings, Kenneth W.**, *Visiting Assistant Professor, Chemistry*. BS, Hofstra University, 1967; MS, 1970, PhD, 1973, University of Massachusetts
- Rippy, Douglas V.**, *Professor, Materials Science and Engineering*. BS, Clemson University, 1964; MS, Air Force Institute of Technology, 1968; PhD, Clemson University, 1974
- Robbins, Tina L.**, *Associate Professor, Management*. BS, Clemson University, 1981; MBA, Winthrop University, 1986; PhD, University of South Carolina, 1991
- Robison, Cathy A.**, *Lecturer, Languages*. BA, Lawrence University, 1980; MA, Southern Illinois University, 1983; MA, University of Georgia, 1996
- Rodgers, John H., Jr.**, *Professor, Forestry and Natural Resources; Director, Clemson Institute of Environmental Toxicology*. BS, 1972, MS, 1974, Clemson University; PhD, Virginia Polytechnic Institute and State University, 1977
- Rogers, Clarence D., Jr.**, *R. Sweetenburgh Professor, Materials Science and Engineering*. BS, 1964; MS, 1966, North Carolina State University; PhD, Clemson University, 1978
- Rojas-de-Massei, Monica M.**, *Assistant Professor, Languages*. BA, Universidad Nacional de Cordoba (Argentina), 1989; MA, 1993, PhD, 1999, University of Iowa
- Rose, Patrick G.**, *Lecturer, Graphic Communications*. BA, Virginia Polytechnic Institute and State University, 1972; MEd, Clemson University, 1990
- Rosenblith, Suzanne N.**, *Assistant Professor, Teacher Education*. BA, Muhlenberg College, 1991; MS, Minnesota State University-Mankato, 1995; PhD, University of Wisconsin-Madison, 2001
- Ross, Roger A.**, *Adjunct Professor, Chemical Engineering*. BS, Clarkson College of Technology, 1963; MS, 1967, PhD, 1970, University of Rochester
- Roth, Linda C.**, *Assistant Professor, Forestry and Natural Resources*. BA, Harvard University, 1971; MS, Yale University, 1979; PhD, Clark University, 1997
- Roth, Michelle L.**, *Lecturer, Languages*. BA, University of Idaho, 1994; MA, Washington State University, 1996
- Roth, Philip L.**, *Professor, Management*. BA, University of Tennessee, 1981; MA, 1985, PhD, 1988, University of Houston
- Rothenberg, Bess A.**, *Assistant Professor, Sociology*. BA, Boston University, 1994; MA, 1997, PhD, 2002, University of Virginia
- Rudolph, Krista Barrier**, *Lecturer, Genetics, Biochemistry, and Life Science Studies*. BS, Clemson University, 1990; MEd, Charleston Southern University, 1992; PhD, Clemson University, 2002
- Ruppert, Mariette V.**, *Assistant Professor, Genetics, Biochemistry, and Life Science Studies*. BS, 1962, MS, 1971, Tufts University
- Rushing, James W.**, *Professor, Horticulture, Coastal Research and Education Center*. BS, Florida Southern College, 1979; MAg, 1981, PhD, 1985, University of Florida

- Russell, Charles B.**, *Associate Professor, Mathematical Sciences*. BA, University of the South, 1962; MS, 1963, PhD, 1967, Florida State University
- Russell, Harlan B.**, *Assistant Professor, Electrical and Computer Engineering*. BS, 1986, MS, 1989, PhD, 1993, University of Illinois-Urbana-Champaign
- Russell, Kevin R.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, University of Idaho, 1991; MS, 1996, PhD, 2000, Clemson University
- Sadler, Edward J.**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BS, University of Missouri, 1976; MS, 1978, PhD, 1983, Texas A&M University
- Saltzman, Matthew J.**, *Associate Professor, Mathematical Sciences*. BA, Cornell University, 1977; MS, 1982, PhD, 1986, Carnegie Mellon University
- Sanders, John P. III**, *Adjunct Professor, Materials Science and Engineering*. BS, 1992, MS, 1993, PhD, 1995, Clemson University
- Sarasua, Wayne A.**, *Associate Professor, Civil Engineering*. BS, University of California-Berkeley, 1984; MS, 1989, PhD, 1992, Georgia Institute of Technology
- Sass, Ronald R.**, *Assistant Professor, Electrical and Computer Engineering*. BS, University of Toledo, 1989; MS, 1992, PhD, 1997, Michigan State University
- Satris, Stephen A.**, *Associate Professor, Philosophy and Religion*. BA, University of California-Los Angeles, 1969; MA, University of Hawaii, 1971; PhD, University of Cambridge (England), 1984
- Sauer, Raymond D., Jr.**, *Professor, Economics*. BA, 1979, MA, 1981, University of New Mexico; PhD, University of Washington, 1985
- Saunders, Richard L., Jr.**, *Associate Professor, History*. BA, Northwestern University, 1962; MA, 1964, PhD, 1971, University of Illinois-Urbana-Champaign
- Sauvain, Kathryn J.**, *Adjunct Assistant Professor, School of Nursing*. BSN, Emory University, 1969; MS, Boston University, 1970
- Sawyer, Raymond C.**, *Professor, Performing Arts*. BS, Shippensburg University of Pennsylvania, 1965; MA, University of Washington, 1971; PhD, University of Illinois-Urbana-Champaign, 1975
- Saylor, John R.**, *Assistant Professor, Mechanical Engineering*. BS, State University of New York-Buffalo, 1986; MS, University of Minnesota, 1989; MPhil, 1993, PhD, 1993, Yale University
- Schach, Janice C.**, *Dean, College of Architecture, Arts, and Humanities; Professor, Landscape Architecture*. BSLA, Purdue University, 1979; MLA, University of Guelph (Canada), 1981; FASLA
- Schalkoff, Robert J.**, *Professor, Electrical and Computer Engineering*. BS, University of Virginia, 1975; MEng, Rensselaer Polytechnic Institute, 1976; PhD, University of Virginia, 1979
- Schiff, Scott D.**, *Professor, Civil Engineering*. BS, University of Cincinnati, 1982; MS, 1984, PhD, 1988, University of Illinois
- Schif, Suzanne Rook**, *Associate Librarian, Cooper Library*. BA, Clemson University, 1993; MLS, University of Alabama, 1994
- Schively, Carissa A.**, *Visiting Assistant Professor, Planning and Landscape Architecture*. BS, Winona State University, 1995; MCRP, Clemson University, 1997
- Schlaumann, Mark A.**, *Assistant Professor, School of the Environment*. BS, University of Nebraska, 1984; MS, 1987, PhD, 1992, California Institute of Technology
- Schleifer, Lydia Lancaster Folger**, *Associate Professor, School of Accountancy and Legal Studies*. BA, Davidson College, 1977; PhD, University of Georgia, 1988
- Schmidt, Johannes**, *Assistant Professor, Languages*. BA, University of Konstanz (Germany), 1992; MA, University of Massachusetts, 1995; PhD, University of Hamburg (Germany), 1999
- Schnabel, Guido**, *Assistant Professor, Entomology, Soils, and Plant Sciences*. BA, 1990, MS, 1993, Justus-Liebig Universität (Germany); PhD, Universität Hohenheim (Germany), 1997
- Schneider, Raymond K.**, *Associate Professor, Construction Science and Management*. BAeroEng, Polytechnic Institute of New York, 1961; MBA, Long Island University, 1969
- Schoulties, Calvin L.**, *Dean, College of Agriculture, Forestry, and Life Sciences; Professor, Plant Pathology and Physiology*. BS, 1965, PhD, 1971, University of Kentucky
- Schroeder, Paul R.**, *Adjunct Associate Professor, Civil Engineering*. BS, University of Illinois-Urbana-Champaign, 1974; MS, Vanderbilt University, 1977; PhD, Ohio State University, 1977
- Schumacher, Robert M.**, *Adjunct Professor, Psychology*. BA, Eastern Illinois University, 1981; MA, 1987, PhD, 1989, University of Illinois-Urbana-Champaign
- Schuster, Guenter A.**, *Adjunct Professor, Forestry and Natural Resources*. BS, University of Dayton, 1971; MS, Eastern Kentucky University, 1973; PhD, University of Tennessee, 1977
- Schwartz, Charles E.**, *Adjunct Professor, Genetics, Biochemistry, and Life Science Studies*. BA, Colgate University, 1970; MS, Oklahoma State University, 1972; PhD, Vanderbilt University, 1978
- Schwartz, Karen G.**, *Adjunct Instructor, Food Science and Human Nutrition*. BS, Western Carolina University, 1981; MS, Winthrop University, 1983
- Schwartz, Robert W.**, *Adjunct Professor, Materials Science and Engineering*. BS, 1977, MS, 1981, North Carolina State University; PhD, University of Illinois, 1989
- Schwedler, Thomas E.**, *Professor, Biological Sciences*. BS, University of Michigan, 1975; MS, Michigan Technological University, 1977; PhD, Auburn University, 1980
- Schweitzer, Sara H.**, *Adjunct Associate Professor, Forestry and Natural Resources*. BS, University of North Carolina, 1985; MS, Texas Technical University, 1988; PhD, Oklahoma State University, 1994
- Scott, Mark C.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, Wofford College, 1987; MS, Virginia Polytechnic Institute and State University, 1994; PhD, University of Georgia, 2001
- Scott, Simon W.**, *Professor, Entomology, Soils, and Plant Sciences*. BSc, Hatfield Polytechnic (England), 1971; PhD, University of Wales (England), 1974
- Scott, Thomas R.**, *Professor, Animal and Veterinary Sciences; Adjunct Professor, Biological Sciences*. BS, 1976, MS, 1979, Louisiana State University; PhD, University of Georgia, 1983
- Seaver, Laurie H.**, *Adjunct Assistant Professor, Genetics, Biochemistry, and Life Science Studies*. BS, 1983, MD, 1987, University of Arizona
- Seiber, Eric E.**, *Assistant Professor, Public Health Sciences*. BS, Eckerd College, 1994; MA, 1996, PhD, 1999, Tulane University
- Senter, Herman F.**, *Associate Professor, Mathematical Sciences*. BS, North Carolina State University, 1965; MS, University of Virginia, 1967; PhD, North Carolina State University, 1973
- Serkiz, Steven M.**, *Adjunct Associate Professor, School of the Environment*. BS, Furman University, 1985; PhD, Georgia Institute of Technology, 1991
- Seydim, Zeynep B.**, *Adjunct Assistant Professor, Animal and Veterinary Sciences*. BS, 1991, MS, 1994, Ankara University (Turkey); MS, 1996, PhD, 2001, Clemson University
- Shalaby, Shalaby W.**, *Adjunct Professor, Bioengineering*. BSc, Ain Shams University (Egypt), 1958; MS, 1963, PhD, 1966, PhD, 1967, University of Lowell
- Shapiro, Martin**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BA, City University of New York-Brooklyn College, 1958; MS, Cornell University, 1961; PhD, University of California-Berkeley, 1966
- Shelburne, Victor B.**, *Associate Professor, Forestry and Natural Resources*. BS, 1973, MF, 1975, Duke University; PhD, Clemson University, 1988
- Shenbaganam, Premalata**, *Visiting Assistant Professor, Finance*. BCom, 1990, MCom, 1992, University of Bombay (India); MA, Clemson University, 1993; MA, 1994, PhD, 1999, Ohio State University
- Shepard, Buford M.**, *Senior Extension Director, Coastal Research and Education Center; Professor, Entomology, Soils, and Plant Sciences*. BS, Middle Tennessee State University, 1966; MS, University of Georgia, 1968; PhD, Texas A&M University, 1971
- Shepherd, Joanna M.**, *Assistant Professor, Economics*. BBA, Baylor University, 1997; PhD, Emory University, 2002
- Sherar, James R.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, University of Kansas, 1972; MF, Oregon State University, 1978
- Sherrill, Windsor W.**, *Assistant Professor, Public Health Sciences*. BS, Wake Forest University, 1987; MHA, MBA, University of Alabama-Birmingham, 1989; PhD, Brandeis University, 1999
- Shier, Douglas R.**, *Professor, Mathematical Sciences*. BA, Harvard University, 1968; PhD, London School of Economics and Political Science (England), 1973
- Shilstone, Frederick W.**, *Professor, English*. BA, Vanderbilt University, 1970; MA, 1972, PhD, 1974, Indiana University
- Shipe, Emerson R.**, *Professor, Entomology, Soils, and Plant Sciences*. BS, University of Tennessee, 1969; MS, Western Kentucky University, 1970; PhD, Virginia Polytechnic Institute and State University, 1978
- Sieverdes, Christopher M.**, *Professor, Applied Economics and Statistics*. BA, University of Richmond, 1966; MS, Virginia Commonwealth University, 1972; PhD, Mississippi State University, 1973
- Sikes, Charles S.**, *Adjunct Professor, Biological Sciences*. BS, 1971, MS, 1973, John Carroll University; PhD, University of Wisconsin-Madison, 1976
- Silance, Robert T.**, *Associate Professor, School of Architecture*. BA, Clemson University, 1973; BFA, Temple University, 1978; MArch, Clemson University, 1981
- Sill, Benjamin L.**, *Director, General Engineering; Alumni Distinguished Professor, Civil Engineering*. BS, 1967, MS, 1969, North Carolina State University; PhD, Virginia Polytechnic Institute and State University, 1974
- Sill, Lois P.**, *Librarian, Cooper Library*. BS, University of North Carolina, 1967; MS, North Carolina State University, 1969; MLS, University of South Carolina, 1988
- Silvers, Stuart**, *Professor, Philosophy and Religion*. BA, 1958, MA, 1960, Michigan State University; PhD, University of Pittsburgh, 1963
- Silvestri, Michael S.**, *Adjunct Lecturer, History*. BA, Brown University, 1988; MA, 1991, MPhil, 1993, PhD, 1998, Columbia University
- Simionescu, Dan Teodor**, *Research Associate/Assistant Professor, Bioengineering*. BS, 1981, PhD, 1999, University of Bucharest (Romania)
- Simmons, Alvin M.**, *Adjunct Associate Professor, Entomology, Soils, and Plant Sciences*. BS, East Carolina University, 1980; MS, 1983, PhD, 1987, University of Kentucky
- Simmons, James Bryan**, *Associate Professor, Graphic Communications*. BS, Western Kentucky University, 1986; MS, Murray State College, 1988; EDD, University of Kentucky, 1994
- Simmons, John D.**, *Adjunct Professor, Agricultural and Biological Engineering*. BS, 1973, MS, 1975, University of Tennessee; PhD, Clemson University, 1986

- Simms, Donna M.**, Lecturer, *Mathematical Sciences*, BS, Bob Jones University, 1990; MS, Clemson University, 1993
- Simon, Curtis J.**, Associate Professor, *Economics*, BA, College of William and Mary, 1981; MA, 1983, PhD, 1985, State University of New York-Binghamton
- Simpson, Roger K.**, Lecturer, *Languages*, BA, 1976, MEd, 1977, Clemson University
- Singh, Rajendra, D.**, Houser Banks Professor, *Electrical and Computer Engineering*, BS, Agra University (India), 1965; MS, Meerut University (India), 1968; MS, Dalhousie University (Canada), 1974; PhD, McMaster University (Canada), 1979
- Sinka, Margit M.**, Professor, *Languages*, BA, Baldwin-Wallace College, 1964; MA, Middlebury College, 1965; PhD, University of North Carolina, 1974
- Sitaraman, Murali**, Associate Professor, *Computer Science*, BE, University of Madras (India), 1983; ME, Indian Institute of Science (India), 1984; PhD, Ohio State University, 1990
- Skaar, Eric C.**, Associate Professor, *Materials Science and Engineering*, BS, Alfred University, 1970; PhD, Massachusetts Institute of Technology, 1975; PE
- Skewes, Peter A.**, Professor, *Animal and Veterinary Sciences*, BS, University of New Haven, 1979; MS, University of Florida, 1982; PhD, Virginia Polytechnic Institute and State University, 1985
- Skinner, Martha L.**, Assistant Professor, *School of Architecture*, BA, University of Florida, 1990; BArch, Cooper Union, 1995
- Sluss, Dorothy J.**, Associate Professor, *Teacher Education*, BS, University of Virginia's College at Wise, 1978; MS, 1983, PhD, 2001, Virginia Polytechnic Institute and State University
- Small, Mark A.**, Professor, *Family and Neighborhood Life*, BA, 1983, MA, 1985, University of Nevada-Las Vegas; JD, 1989, PhD, 1990, University of Nebraska
- Smallwood, Margaret E.**, Lecturer, *Languages*, BA, Bridgewater College, 1973; MA, Auburn University, 1974
- Smart, Patricia T.**, Professor, *School of Nursing*, BSN, Clemson University, 1979; MN, University of South Carolina, 1980; PhD, University of Georgia, 1994
- Snathens, Diane G.**, Professor, *Off-Campus Distance, and Continuing Education*, BS, 1973, MS, 1974, University of Kentucky; EdD, University of Georgia, 1980
- Snathens, Webb M., Jr.**, Professor, *Applied Economics and Statistics*, BA, University of North Carolina, 1970; BA, 1972, MS, 1975, PhD, 1980, University of Kentucky
- Smiley, E. Thomas**, Adjunct Professor, *Forestry and Natural Resources*, BS, University of Wisconsin, 1977; MS, Colorado State University, 1979; PhD, Michigan State University, 1985
- Smink, Jay**, Director, *National Dropout Prevention Center; Professor, Teacher Education*, BS, Millersville State College, 1959; MEd, 1961, EdD, 1966, Pennsylvania State University
- Smith, Alton D.**, Associate Professor, *Genetics, Biochemistry, and Life Science Studies*, BS, Mississippi College, 1972; MS, East Texas State University, 1977
- Smith, Bill R.**, Professor, *Entomology, Soils, and Plant Sciences*, BS, Texas Technical University, 1964; MS, University of Arizona, 1966; PhD, North Carolina State University, 1970
- Smith, Christa A.**, Assistant Professor, *History*, BA, Jr., MA, 1990, Marshall University; PhD, University of Tennessee, 2000
- Smith, Daniel J.**, Assistant Professor, *Languages*, BA, Bob Jones University, 1978; MEd, University of Georgia, 1985; PhD, University of Texas, 2002
- Smith, Deborah A.**, Associate Professor, *Teacher Education*, BS, Madison College, 1977; MS, 1985, EdD, 1989, University of Tennessee
- Smith, Dennis W., Jr.**, Associate Professor, *Chemistry*, BS, 1988, PhD, 1992, University of Florida
- Smith, Eddie R.**, Lecturer, *Communication Studies*, BA, 1979, MA, 1981, Bob Jones University
- Smith, Garnett W.**, Adjunct Associate Professor, *Biological Sciences*, BS, 1974, MAT, 1975, Winthrop University; MS, 1977, PhD, 1981, Clemson University
- Smith, John P.**, Associate Professor, *Entomology, Soils, and Plant Sciences*, BS, 1979, MS, 1984, University of Georgia; PhD, Clemson University, 2003
- Smith, John R.**, Lecturer, *English*, BA, Furman University, 1990; MA, 1992, PhD, 1999, Boston University
- Smith, Kelly C.**, Associate Professor, *Philosophy and Religion*, BA, Georgia State University, 1986; MS, 1991, PhD, 1994, Duke University
- Smith, Kerry S.**, Assistant Professor, *Genetics, Biochemistry, and Life Science Studies*, BS, Georgia Institute of Technology, 1986; PhD, University of Pennsylvania, 1993
- Smith, Robert W.**, Assistant Professor, *Political Science*, BA, College of Saint Rose, 1980; MPA, 1984, PhD, 1998, State University of New York-Albany
- Smith, Samuel W., Jr.**, Adjunct Professor, *Biological Sciences*; Assistant Medical Director, *Department of Internal Medicine, Greenville Hospital System*, BS, Davidson College, 1959; MD, University of Pennsylvania, 1963
- Smith, Theodore L. J.**, Adjunct Professor, *Forestry and Natural Resources*, BS, Cornell University, 1966; MS, C. W. Post College, 1968; PhD, University of Miami, 1973
- Smotherman, Mark K.**, Associate Professor, *Computer Science*, BS, Middle Tennessee State University, 1977; PhD, University of North Carolina, 1984
- Snider, Eric H.**, Adjunct Assistant Professor, *School of the Environment*, BS, 1973, MS, 1975, PhD, 1978, Clemson University
- Snyder, Mark R.**, Associate Professor, *Graphic Communications*, BS, Millersville University of Pennsylvania, 1984; MA, Eastern Michigan University, 1985; EdD, Virginia Polytechnic Institute and State University, 1992
- Song, Bo**, Assistant Professor, *Forestry and Natural Resources*, BS, Liaoning University (China), 1985; MS, Chinese Academy of Science (China), 1988; PhD, Michigan Technological University, 1998
- Song, Je June**, Adjunct Associate Professor, *Packaging Science*, BS, 1981, MS, 1986, Chonbuk National University (Korea); PhD, Kyoto University (Japan), 1992
- Sosolik, Chad E.**, Assistant Professor, *Physics and Astronomy*, BS, Texas A&M University, 1995; MS, 1998, PhD, 2001, Cornell University
- Southerland, Marcella B.**, Adjunct Associate Professor, *School of Nursing*, BA, Central Wesleyan College, 1972; MEd, Clemson University, 1977
- Spacciante, Stephanie E.**, Lecturer, *Languages*, BA, Central Washington University, 1994; MA, Washington State University, 1996
- Sparace, Kathryn Francine**, Lecturer, *Genetics, Biochemistry, and Life Science Studies*, BA, 1978, MS, 1981, University of Wyoming; PhD, University of California-Berkeley, 1990
- Sparace, Salvatore A.**, Associate Professor, *Genetics, Biochemistry, and Life Science Studies*, BS, Cornell University, 1975; PhD, University of Wyoming, 1980
- Sparks, Elisa K.**, Associate Professor, *English*, BA, Bryn Mawr College, 1973; MA, 1977, PhD, 1978, Indiana University
- Sparks, Peter R.**, Professor, *Civil Engineering*, BSc, University of Bristol (England), 1968; PhD, University of London (England), 1974
- Spede, Mark J.**, Assistant Professor, *Performing Arts; Director of Bands*, BM, University of Michigan-Ann Arbor, 1984; MM, Ball State University, 1988; DMA, University of Texas-Austin, 1998
- Sperry, Stephen L.**, Associate Professor, *Planning and Landscape Architecture*, BLA, State University of New York-Syracuse, 1970; MLA, Harvard University, 1975
- Speziale, Barbara J.**, Associate Dean and Program Director, *Youth Development and Families*, Associate Professor, *Biological Sciences*, BA, State University of New York, 1974; MS, University of Minnesota, 1977; PhD, Clemson University, 1985
- Spira, Timothy P.**, Professor, *Biological Sciences*, BA, 1975, MA, 1978, California State University, PhD, University of California, 1983
- Spitler, Hugh D.**, Associate Professor, *Public Health Sciences*, BA, 1972, MA, 1974, University of South Florida; PhD, 1985, MPH, 1996, Emory University
- Spivey, Michael E.**, Wachovia Professor, *Finance*, BA, North Carolina State University, 1973; MBA, East Carolina University, 1978; PhD, University of Tennessee, 1987
- Sridharan, V.**, Professor, *Management*, BE, Madurai-Kamaraj University (India), 1975; PhD, University of Iowa, 1987
- Srinani, Pradip K.**, Department Chair and Professor, *Computer Science*, BS, 1970, BTEch, 1973, MTech, 1975, PhD, 1978, University of Calcutta (India)
- Stravastava, Anand K.**, Adjunct Assistant Professor, *Genetics, Biochemistry, and Life Science Studies*, Adjunct Professor, *Biological Sciences*, BS, 1979, MS, 1981, University of Allahabad (India); PhD, Banaras Hindu University (India), 1986
- St. John, Caron H.**, Professor, *Management*, BS, Georgia Institute of Technology, 1976; MBA, 1984, PhD, 1988, Georgia State University
- Stanton, William A.**, Lecturer, *English*, BA, 1966, MA, 1967, Jersey City State College
- Stanzione, Daniel C., Jr.**, Research Associate/Assistant Professor, *Electrical and Computer Engineering*, BS, 1991, MS, 1993, Clemson University
- Starkey, Charles**, Assistant Professor, *Philosophy and Religion*, BA, Claremont McKenna College, 1987; MA, 2001, PhD, 2001, University of Wisconsin
- Stasiukaitis, Sara E.**, Lecturer, *Management*, BS, Furman University, 1995; MS, Clemson University, 1997
- Staufenger, Warner Benjamin**, Lecturer, *Mathematical Sciences*, BS, Baldwin-Wallace College, 1999; MS, Clemson University, 2001
- Stecker, Pamela M.**, Associate Professor, *Teacher Education*, BS, 1982, MEd, 1988, PhD, 1993, Vanderbilt University
- Stegall, David L.**, Lecturer, *Philosophy and Religion*, BA, 1984, MLitSc, 1984, University of North Carolina
- Stegelin, Dolores A.**, Associate Professor, *Teacher Education*, BS, 1969, MS, 1970, Kansas State University; PhD, University of Florida, 1983
- Steiner, Sascha**, Adjunct Assistant Professor, *Biological Sciences*, PhD, University of Vienna (Austria), 1991
- Steirer, William F., Jr.**, Associate Professor, *History*, BA, Gettysburg College, 1959; MA, 1962, PhD, 1972, University of Pennsylvania
- Stephan, Elizabeth A.**, Visiting Instructor, *General Engineering*, BS, 1993, PhD, 1999, University of Akron
- Stephens, Benjamin R.**, Associate Professor, *Psychology*, BS, University of Georgia, 1979; PhD, University of Texas, 1985
- Sterling, Patrick D.**, Lecturer, *Computer Science*, BS, University of Southwestern Louisiana, 1971; MS, Clemson University, 1997
- Stevens, Bonnie W.**, Assistant Professor, *Parks, Recreation, and Tourism Management; Director, Nonprofit Leadership Minor*, BS, 1976, MRPA, 1978, EdD, 1997, Clemson University
- Stevens, J. Herbert, Jr.**, Lecturer, *Health, Education, Human Development College Support Services*, BSF, University of Florida, 1975; MRPA, Clemson University, 1978
- Stevenson, Dennis E.**, Associate Professor, *Computer Science*, BA, Eastern Michigan University, 1965; MS, Rutgers University, 1975; PhD, Clemson University, 1983

- Stevenson, Roger E.**, *Adjunct Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Furman University, 1962; MD, Wake Forest University, 1966
- Stewart, Wayne H., Jr.**, *Associate Professor, Management*. BS/BA, 1984, MBA, 1988, Western Carolina University; PhD, University of North Texas, 1995
- Strill, Hugh R.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, University of Georgia, 1978; MS, Clemson University, 1980
- Stocks, Stephanie Dawn**, *Lecturer, Biological Sciences*. BS, Texas A&M University, 1994; BS, University of Tennessee, 1996; MS, Western Carolina University, 2000
- Stoddard, Allison K.**, *Visiting Instructor, Mathematical Sciences*. BA, 1985, MS, 1990, Clemson University
- Stone, Kenneth C.**, *Adjunct Associate Professor, Agricultural and Biological Engineering*. BS, 1981, MS, 1985, PhD, 1987, University of Florida
- Straka, Thomas J.**, *Professor, Forestry and Natural Resources*. BS, 1972, MS, 1973, University of Wisconsin; MBA, University of South Carolina, 1978; PhD, Virginia Polytechnic Institute and State University, 1981
- Stringer, William C.**, *Associate Professor, Entomology, Soils, and Plant Sciences*. BSA, 1968, MS, 1972, University of Georgia; PhD, Virginia Polytechnic Institute and State University, 1979
- Stroud, Ronald K.**, *Assistant Professor, Aerospace Studies; Captain U.S. Air Force*. BS, University of West Florida, 1990; MBA, College of Santa Fe, 1993
- Stuart, Steven J.**, *Assistant Professor, Chemistry*. BS, University of Delaware, 1990; MA, 1991, MPhil, 1994, PhD, 1995, Columbia University
- Sturkie, Douglas K.**, *Department Chair and Professor, Sociology*. BA, Newberry College, 1970, MSW, University of South Carolina, 1973; PhD, University of Southern California, 1979
- Sullivan, Michael Jack**, *Professor, Entomology, Soils, and Plant Sciences, Edisto Research and Education Center*. BS, Texas Technical University, 1967; MS, 1971, PhD, 1973, North Carolina State University
- Summers, Joshua D.**, *Assistant Professor, Mechanical Engineering*. BSME, 1996, MSME, 1998, University of Missouri; PhD, Arizona State University, 2002
- Summers, Timothy P.**, *Associate Professor, Management*. BA, 1976, MBA, 1978, West Virginia University; PhD, University of South Carolina, 1986
- Sun, Yaping**, *Professor, Chemistry*. BS, Zhengzhou Institute of Technology (China), 1982; MS, Zhejiang University (China), 1985; PhD, Florida State University, 1989
- Surak, John G.**, *Professor, Applied Economics and Statistics*. BS, 1971, MS, 1972, PhD, 1974, University of Wisconsin
- Surver, William M.**, *Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Saint Francis College, 1966; PhD, University of Notre Dame, 1974
- Swank, Wayne T.**, *Adjunct Professor, Forestry and Natural Resources*. BS, West Virginia University, 1958; MF, 1960, PhD, 1972, University of Washington
- Swanson, Elizabeth O.**, *Lecturer, School of Nursing*. BS, Baylor University, 1975; MSN, 1990; MPH, 1990, Emory University
- Sweeney, John R.**, *Interim Associate Dean, College of Agriculture, Forestry, and Life Sciences; Professor, Forestry and Natural Resources*. BSF, 1967, MS, 1971, University of Georgia; PhD, Colorado State University, 1975
- Switzer, Deborah M.**, *Associate Professor, Teacher Education*. BA, University of Texas, 1976; MEd, 1987, PhD, 1993, University of Illinois
- Switzer, Fred S. III**, *Professor, Psychology*. BA, University of Texas, 1975; MS, Lamar University, 1982; PhD, University of Illinois, 1988
- Swords, Allen N.**, *Lecturer, English*. BA, 1997, MA, 2002, Clemson University
- Swords, Nicole T.**, *Lecturer, English*. BA, Barry University, 1998; MA, Clemson University, 2001
- Smurlo, Karyna M.**, *Professor, Languages*. BA, 1965, MA, 1967, University of Warsaw (Poland); MA, 1977, PhD, 1981, Rutgers University
- Tagliarini, Gene A.**, *Adjunct Assistant Professor, Computer Science*. BA, 1970, MA, 1971, University of South Florida; PhD, Clemson University, 1989
- Taha, Tarek M.**, *Assistant Professor, Electrical and Computer Engineering*. BA, DePaul University, 1994; BEE, 1996, MS, 1998, PhD, 2002, Georgia Institute of Technology
- Tamura, Robert F.**, *Associate Professor, Economics*. BS, College of William and Mary, 1981; MA, 1983, PhD, 1988, University of Chicago
- Taylor, Dennis S.**, *Librarian, Cooper Library*. BA, Piedmont College, 1977; MA, University of Georgia, 1981; MLn, Emory University, 1986
- Taylor, Mary A.**, *Professor, Psychology*. BA, Western Kentucky University, 1983; MS, Virginia Polytechnic Institute and State University, 1985; PhD, University of Akron, 1990
- Taylor, Paul M.**, *Adjunct Professor, Mechanical Engineering*. BA, University of Cambridge (England), 1972; MS, 1973, PhD, 1976, Victoria University of Manchester (England)
- Taylor, Robert L.**, *Department Chair and Professor, Mathematical Sciences*. BS, University of Tennessee, 1966; MS, 1969, PhD, 1971, Florida State University
- Taylor, Summer Smith**, *Assistant Professor, English*. BA, University of South Carolina, 1993; MA, 1995, PhD, 2000, Pennsylvania State University
- Taylor, Theodore D.**, *Associate Professor, Materials Science and Engineering*. BS, Alfred University, 1963; MS, 1966, PhD, 1971, Pennsylvania State University; PE
- Taylor-Shockley, Megan Newbury**, *Assistant Professor, History*. BA, University of Richmond, 1993; MA, University of Tennessee-Chattanooga, 1995; PhD, University of Arizona, 2000
- Temesvari, Lesly**, *Assistant Professor, Biological Sciences*. BS, McGill University (Canada), 1987; PhD, University of Windsor (Canada), 1993
- Temples, Tommy J.**, *Adjunct Associate Professor, School of the Environment*. BS, Clemson University, 1976; MS, University of Georgia, 1978; PhD, University of South Carolina, 1996
- Templeton, Scott R.**, *Assistant Professor, Applied Economics and Statistics*. BA, 1983, MS, 1987, University of California-Santa Cruz; PhD, University of California-Berkeley, 1994
- Tessema, Guebre X.**, *Professor, Physics and Astronomy*. BS, 1974, MS, 1975, PhD, 1979, University of Grenoble (France)
- Thames, Brenda Joyce**, *Professor, Family and Community Studies*. BS, Mississippi State University, 1976; MEd, 1985, EdL, 1992, Clemson University
- Thatcher, Jason B.**, *Assistant Professor, Management*. BA, 1994, BA, 1999, University of Utah; MPA, 1999, PhD, 2002, Florida State University
- Thies, Judy A.**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BS, 1972, MS, 1982, PhD, 1988, University of Minnesota
- Thies, Mark C.**, *Professor, Chemical Engineering*. BChE, Georgia Institute of Technology, 1977; PhD, University of Delaware, 1985; PE
- Thomas, Claude E.**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BS, Wofford College, 1962; MS, 1964, PhD, 1966, Clemson University
- Thomas, Ronald L.**, *Department Chair and Professor, Packaging Science*. BS, Gardner-Webb University, 1973; MS, 1975, PhD, 1980, Clemson University
- Thomason, Deborah J.**, *Associate Professor, Family and Community Studies*. BS, 1977, MEd, 1979, EdS, 1986, University of Georgia; EdD, Clemson University, 1992
- Thompson, C. Stassen**, *Director, Office of Land Management; Professor, Agricultural and Applied Economics*. BS, Murray State College, 1968; MS, 1969, PhD, 1972, University of Kentucky
- Thompson, G. Richard**, *Professor, Economics*. BA, University of South Florida, 1966; PhD, University of Virginia, 1972
- Thompson, Lonny L.**, *Associate Professor, Mechanical Engineering*. BS, University of California, 1985; MS, 1989, PhD, 1994, Stanford University
- Thompson, Major C.**, *Adjunct Professor, School of the Environment*. BS, Birmingham-Southern College, 1959; MS, 1961, PhD, 1963, Ohio State University
- Thompson, Sharon W.**, *Associate Professor, School of Nursing*. BS, 1968, MS, 1968, Murray State College; PhD, University of Kentucky, 1973
- Timms, Janet L.**, *Associate Professor, School of Nursing*. BS, 1981, MS, 1986, Clemson University; EdD, University of Georgia, 1992
- Tinsley, Joseph L.**, *Lecturer, School of the Environment*. BA, 1986, MA, 1989, MS, 1994, Clemson University
- Tissera, Graciela E.**, *Assistant Professor, Languages*. Licenciada en Gramaticas Española, Universidad Nacional de Cordoba (Argentina), 1985; PhD, University of Pennsylvania, 1992
- Toler, Joe E.**, *Professor, Applied Economics and Statistics*. BS, 1966, MSA, 1968, University of Georgia; PhD, Clemson University, 1990
- Tollison, Robert Dewitt**, *Professor, Economics*. BA, Wofford College, 1964; MA, University of Alabama, 1965; PhD, University of Virginia, 1969
- Tomasso, Joseph R., Jr.**, *Professor, Biological Sciences*. BS, University of Tennessee-Martin, 1974; MS, Middle Tennessee State University, 1978; PhD, Memphis State University, 1981
- Tomkins, Jeffrey P.**, *Assistant Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Washington State University, 1985; MS, University of Idaho, 1990; PhD, Clemson University, 1996
- Tong, Chenning**, *Assistant Professor, Mechanical Engineering*. BS, 1983, ME, 1985, Beijing Institute of Aeronautics and Astronautics (China); PhD, Cornell University, 1995
- Tonkyn, David W.**, *Associate Professor, Biological Sciences*. BA, 1976, MA, 1978, PhD, 1985, Princeton University
- Trapnell, Jerry E.**, *Dean, College of Business and Behavioral Science; Professor, Accounting*. BS, 1968, MS, 1970, Clemson University; PhD, University of Georgia, 1977; CPA
- Tritt, Terry M.**, *Professor, Physics and Astronomy*. BA, 1980, PhD, 1985, Clemson University
- Trubiano, Franca**, *Visiting Associate Professor, School of Architecture*. BSc, 1987, BArch, 1988, MArch, 1995, McGill University (Canada)
- Turnbull, Matthew W.**, *Assistant Professor, Entomology, Soils, and Plant Sciences*. BS, 1994, MA, 1999, College of William and Mary; PhD, University of Kentucky, 2002
- Turnipseed, Samuel G.**, *Professor, Entomology, Soils, and Plant Sciences, Edisto Research and Education Center*. BA, University of North Carolina, 1956; MS, Clemson University, 1958; PhD, North Carolina State University, 1961
- Tyler, Peggy J.**, *Associate Librarian, Cooper Library*. BS, Johnson State College, 1983; MLS, State University of New York-Albany, 1988
- Tyrrell, Richard A.**, *Associate Professor, Psychology*. BA, Hartwick College, 1985; MS, 1989, PhD, 1993, Pennsylvania State University
- Tzeng, Tzuen-Rong J.**, *Lecturer, Biological Sciences*. BS, Tsinghai University (China), 1985; PhD, Clemson University, 1998
- Ueshina, Toshi**, *Assistant Professor, Art*. BFA, San Francisco Art Institute, 1982; MFA, Arizona State University, 1999

- Ulloa, Mauricio**, *Adjunct Associate Professor, Genetics, Biochemistry, and Life Science Studies*. BS, College of Agriculture, Hermanos Escobar (Mexico), 1984; MS, 1990, PhD, 1993, New Mexico State University
- Valentino, Susan L.**, *Adjunct Associate Professor, Animal and Veterinary Sciences*. BS, Cornell University, 1981; PhD, Clemson University, 1991
- Van Cleave, Ryan Gene**, *Assistant Professor, English*. BA, Northern Illinois University, 1994; MA, 1997, PhD, 2001, Florida State University
- Van den Hurk, Peter**, *Assistant Professor, Biological Sciences*. BS, State University of Groningen (The Netherlands), 1983; MS, University of Amsterdam (The Netherlands), 1988; PhD, College of William and Mary, 1998
- Van Lear, David H.**, *Robert Aldger Bowen Professor, Forest Resources*. BS, 1963, MS, 1965, Virginia Polytechnic Institute and State University; PhD, University of Idaho, 1969
- Vander Mey, Brenda J.**, *Professor, Sociology*. BA, Trinity Christian College, 1978; MA, 1981, PhD, 1984, Mississippi State University
- Vander Mey, Gerald A.**, *Adjunct Professor, Planning and Landscape Architecture*. BLA, 1982, MS, 1984, Mississippi State University; RLA
- VanDerveer, Donald G.**, *Lecturer, Chemistry*. AB, Middlebury College, 1969; PhD, Brown University, 1974
- Vatalaro, Michael V.**, *Acting Department Chair and Professor, Art*. BFA, University of Akron, 1972; MFA, Alfred University, 1976
- Vaughn, Edward A.**, *Professor, Materials Science and Engineering*. BS, Lynchburg College, 1962; MS, Institute of Textile Technology, 1964; PhD, Victoria University of Manchester (England), 1969; CTEXT, FTI
- Vergano, Peter J.**, *Professor, Packaging Science*. BS, 1965, BA, 1965, Rutgers University; ScD, Massachusetts Institute of Technology, 1969
- Viktorova, Irina V.**, *Visiting Assistant Professor, Mathematical Sciences*. MS, Moscow State University (Russia), 1977; PhD, Mechanical Engineering Research Institute of the Russian Academy of Science (Russia), 1983
- Voelkl, Judith E.**, *Associate Professor, Parks, Recreation, and Tourism Management*. BS, Illinois State University, 1979; MS, Indiana University, 1985; PhD, Pennsylvania State University, 1989
- Von Oehsen, James B.**, *Research Associate/Assistant Professor, Mathematical Sciences*. BA, 1984, PhD, 1991, Rutgers University
- Vosburgh, Teresa Dunn**, *Lecturer, English*. BS, Bob Jones University, 1997; MA, Clemson University, 1999
- Vvavahare, Narendra R.**, *Associate Professor, Bioengineering*. BS, 1983, MS, 1985, PhD, 1990, University of Pune (India)
- Wagener, Earl H.**, *Adjunct Assistant Professor, Chemistry*. BS, 1962, PhD, 1967, Clemson University
- Wagner, John R.**, *Assistant Professor, Mechanical Engineering*. BS, 1983, MS, 1985, State University of New York-Buffalo; PhD, Purdue University, 1989
- Wagner, John R.**, *Professor, School of the Environment*. BS, Muhlenberg College, 1970; MEd, 1972, MA, 1976, Temple University; PhD, University of South Carolina, 1993
- Wagner, Lisa K.**, *Director, South Carolina Botanical Garden*. BA, University of Texas-Austin, 1976; PhD, University of California-Berkeley, 1983
- Wagner, Thomas E.**, *Professor, Biological Sciences; Adjunct Professor, Chemistry*. BA, Princeton University, 1964; PhD, Northwestern University, 1966
- Waincott, Stephen H.**, *Assistant Dean, Honors Program; Professor, Political Science*. BA, Saint Andrews Presbyterian College, 1967; MA, 1972, PhD, 1976, Miami University
- Wakefield, Jennie E.**, *Lecturer, English*. BFA, Boston Conservatory, 1977; MA, Clemson University, 2001
- Waldvogel, Jerry A.**, *Associate Professor, Genetics, Biochemistry, and Life Science Studies*. BS, Stanford University, 1976; PhD, Cornell University, 1981
- Walker, Gerald J.**, *Assistant Professor, Military Leadership; Major U.S. Army*. BS, United States Military Academy, 1983; MA, University of North Carolina, 1992; MS, Kansas State University, 2000
- Walker, Ian D.**, *Professor, Electrical and Computer Engineering*. BS, University of Hull (England), 1983; MS, 1985, PhD, 1989, University of Texas-Austin
- Walker, Joan L.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, Lebanon Valley College, 1975; MS, 1980, PhD, 1985, University of North Carolina
- Walker, Meredith L.**, *Lecturer, English*. BA, University of South Carolina, 1984; MAEd, Western Carolina University, 1987
- Walker, Miranda Letitia**, *Lecturer, School of Accountancy and Legal Studies*. BS, 1990, MPAcc, 1993, Clemson University; CPA
- Walker, Nancy Hilton**, *Associate Professor, Entomology, Soils, and Plant Sciences*. BA, Emory University, 1967; PhD, Clemson University, 1982
- Walker, S. Erwin**, *Lecturer, Mathematical Sciences*. BA, University of North Carolina, 1996; MS, Clemson University, 1998
- Walker, Terry H.**, *Associate Professor, Agricultural and Biological Engineering*. BS, 1989, MS, 1992, PhD, 1997, University of Tennessee
- Waller, Neil G.**, *Professor, Finance*. BS, 1975, MA, 1978, University of Florida; PhD, University of Texas, 1986; MAI
- Wang, Gaofeng G.**, *Assistant Professor, Forestry and Natural Resources*. BSc, 1983, MSc, 1986, Nanjing Forestry University (China); PhD, University of British Columbia (Canada), 1993
- Wang, Samuel M.**, *Alumni Professor, Art*. BA, Augustana College, 1964; MFA, University of Iowa, 1966
- Wang, Zijun**, *Assistant Professor, Computer Science*. BS, 1990, MS, 1993, University of Science and Technology (China); PhD, University of Central Florida, 2001
- Warber, Adam L.**, *Assistant Professor, Political Science*. BA, Hope College, 1993; MA, Western Michigan University, 1996; PhD, Texas A&M University, 2002
- Ward, David A.**, *Professor, Sociology*. BA, Florida Atlantic University, 1971; MA, 1973, PhD, 1975, University of Florida
- Ward, William A.**, *Professor, Applied Economics and Statistics*. BA, 1965, MS, 1967, Clemson University; PhD, Michigan State University, 1972
- Ward-Vaughn, Virginia L. S.**, *Assistant Professor, School of Accountancy and Legal Studies*. BA, University of Hawaii, 1982; JD, George Washington University, 1987; MPAcc, Clemson University, 1995
- Warner, Daniel D.**, *Professor, Mathematical Sciences*. BS, 1965, MA, 1966, Arizona State University; PhD, University of California, 1974
- Warner, John T.**, *Professor, Economics*. BA, Wake Forest University, 1969; ME, 1972, PhD, 1976, North Carolina State University
- Warner, Richard D.**, *Professor, School of the Environment*. BS, Massachusetts Institute of Technology, 1966; PhD, Stanford University, 1971
- Watson, Whitten S.**, *Lecturer, Philosophy and Religion*. BFA, Memphis College of Art, 1991
- Watt, Charles K.**, *Professor, Materials Science and Engineering*. BS, Clemson University, 1959; MBA, Industrial College of the Armed Forces, 1972; MS, 1973, PhD, 1986, George Washington University
- Watt, Paula J.**, *Manager, Clinical Education and Practice; Joseph F. Sullivan Center; Lecturer, School of Nursing*. BS, 1993, MS, 1994, Clemson University; PhD, Clayton College of Natural Health, 1999
- Weatherford, Carol G.**, *Associate Professor, Teacher Education*. BS, 1972, MS, 1973, EdS, 1975, University of Georgia; EdD, North Carolina State University, 1984
- Weatherford, David E., Jr.**, *Professor, Family and Community Studies*. BS, 1972, MEd, 1978, University of Georgia; EdD, North Carolina State University, 1981
- Webb, Charles K.**, *Assistant Professor, Bioengineering*. BS, Clemson University, 1992, PhD, University of Utah, 1999
- Weber, Allen**, *Adjunct Professor, School of the Environment*. BS, Brigham Young University, 1960; MS, University of Arizona, 1962; PhD, University of Utah, 1966
- Weems, Jerome J., Jr.**, *Adjunct Assistant Professor, Biological Sciences; Associate Director, Internal Medicine Greenville Hospital System*. BA, Rhodes College, 1977, MD, University of Tennessee, 1981
- Wei, Yanzhang**, *Assistant Professor, Biological Sciences*. BS, Shenyang Normal College (China), 1982; MS, Institute of Hydrobiology of the Chinese Academy of Sciences (China), 1985, PhD, Ohio University, 1996
- Weigel, Timothy G.**, *Assistant Professor, Packaging Science*. BS, 1984, MS, 1991, MS, 1996, Michigan State University; PhD, Virginia Polytechnic Institute and State University, 2000
- Weir, Julia K.**, *Lecturer, Teacher Education*. BS, Northwest Missouri State University, 1962; MEd, Iowa State University, 1990
- Weissenmiller, Eric M.**, *Assistant Professor, Graphic Communications*. BA, 1993, MT, 1995, Georgia Southern University; PhD, Virginia Polytechnic Institute and State University, 1999
- Wells, Christina E.**, *Assistant Professor, Horticulture*. BS, Temple University, 1994; PhD, Pennsylvania State University, 1999
- Wells, Gary J.**, *Professor, Applied Economics and Statistics*. BA, University of North Carolina, 1973; ME, 1974, PhD, 1977, North Carolina State University
- Wells, John K.**, *Lecturer, Agricultural Research*. BS, 1976, MS, 1983, Clemson University
- Welton, Ralph E., Jr.**, *School Director and Professor, School of Accountancy and Legal Studies*. BA, Anderson University, 1976; MS, 1978, PhD, 1982, Louisiana State University
- Wen, Xuejun**, *Assistant Professor, Bioengineering*. MD, Henan Medical University (China), 1994; MS, Zhejiang University (China), 1997; MS, University of Cincinnati, 1999; PhD, University of Utah, 2003
- Wentworth, William M.**, *Professor, Sociology*. BA, Indiana University, 1972; MA, University of Maryland, 1974; PhD, University of Virginia, 1978
- Werth, David E., Jr.**, *Assistant Professor, Civil Engineering*. BS, State University of New York, 1993; MS, 1997, PhD, 1997, Utah State University
- Wesley, Kathryn M.**, *Assistant Librarian, Cooper Library*. BA, Northeast Louisiana University, 1977; MLIS, University of Southern Mississippi, 1997
- Westall, James M., Jr.**, *Professor, Computer Science*. BS, Davidson College, 1968; PhD, 1973, MS, 1978, University of North Carolina
- Wetsel, Margaret A.**, *Associate Professor, School of Nursing*. BSN, Indiana University, 1978; MS, Ohio State University, 1979; PhD, University of Texas-Austin, 1988
- Wheeler, Alfred G., Jr.**, *Adjunct Professor, Entomology, Soils, and Plant Sciences*. BA, Grinnell College, 1966; PhD, Cornell University, 1971
- Wheeler, Alfred P.**, *Department Chair and Professor, Biological Sciences*. BS, Butler University, 1969; PhD, Duke University, 1975
- Whetstone, Jack M.**, *Associate Professor, Forestry and Natural Resources*. BS, 1975, MS, 1978, Clemson University
- Whisler, Bruce A.**, *Lecturer, Performing Arts*. BS, 1982, MM, 1992, Ball State University

- Whitaker, Mary Christina Pennington**, *Visiting Assistant Professor, Teacher Education*. BA, Clemson University, 1992; MEd, The Citadel, 1999; PhD, Clemson University, 2003
- White, Charlie R., Jr.**, *Associate Professor, Parks, Recreation, and Tourism Management*. BS, North Carolina State University, 1966; MS, Indiana University, 1967
- White, Curtis D., Sr.**, *Associate Professor, Agricultural and Biological Engineering*. BS, Clemson University, 1980; MS, 1985, PhD, 1988, University of Missouri
- Whiteside, William S.**, *Extension Associate/Assistant Professor, Packaging Science*. BS, 1984, MS, 1986, PhD, 1999, Clemson University
- Whitwell, Ted**, *Department Chair and Professor, Horticulture*. BS, University of Tennessee-Martini, 1972; MS, 1974, PhD, 1977, Oklahoma State University
- Wicker, David L.**, *Adjunct Professor, Animal and Veterinary Sciences*. BS, 1969, PhD, 1973, Clemson University
- Wicks, Bruce E.**, *Adjunct Associate Professor, Parks, Recreation, and Tourism Management*. BS, 1970, MA, 1979, State University of New York-Brockport; PhD, Texas A&M University, 1986
- Wiecek, Margaret Maria**, *Professor, Mathematical Sciences*. MS, 1979, PhD, 1984, University of Mining and Metallurgy (Poland)
- Wiesman, Daryl W.**, *Assistant Professor, Communication Studies*. BA, Northern Kentucky University, 1974; MA, Eastern Illinois University, 1976; PhD, Florida State University, 2000
- Wiggers, Ernie P.**, *Adjunct Associate Professor, Forestry and Natural Resources*. BS, 1975, MS, 1979, Clemson University; PhD, Texas Technical University, 1983
- Wigley, T. Bentley, Jr.**, *Adjunct Assistant Professor, Forestry and Natural Resources*. BS, 1975, MS, 1977, PhD, 1981, Mississippi State University
- Wilkinson, Nancy S.**, *Lecturer, Teacher Education*. BA, Florida State University, 1963; MEd, Clemson University, 1972
- Willand, Jennifer Roseanne**, *Visiting Instructor, Political Science*. BA, University of Connecticut, 1992; MPA, University of Montana, 1994; MA, University of South Carolina, 1997
- Williams, Calvin L.**, *Associate Professor, Mathematical Sciences*. BS, College of Charleston, 1981; PhD, Medical University of South Carolina, 1987
- Williams, Dwight C.**, *Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences*. BS, 1977, MS, 1979, University of Arkansas; PhD, Louisiana State University, 1984
- Williams, E. Leslie, Jr.**, *Assistant Professor, Languages*. BA, 1988, MA, 1990, Florida State University; PhD, University of Pittsburgh, 1997
- Williams, Frankie Keels**, *Assistant Professor, Leadership, Technology, and Counselor Education*. BS, Winthrop College, 1974; MEd, South Carolina State University, 1978; EdS, 1991, PhD, 1996, University of South Carolina
- Williams, James Edward**, *Lecturer, National Scholars*. BA, 1995, MEd, 1997, University of South Carolina
- Williams, Marty H.**, *Director, Cooperative Education Program; Lecturer, Management*. BA, 1975, MEd, 1977, EdD, 2002, Clemson University
- Williams, Rewa Colette**, *Lecturer, Teacher Education*. BS, 1992, MEd, 1993, Florida Agricultural and Mechanical University
- Williams, Sean D.**, *Assistant Professor, English*. BA, University of Utah, 1992; MA, University of Arizona, 1996; PhD, University of Washington, 1999
- Williams, Thomas M.**, *Professor, Forestry and Natural Resources*. Belle W. Baruch Forest Science Institute. BS, 1969, MS, 1971, PhD, 1976, University of Minnesota
- Williamson, Robert E.**, *Instructor, Agricultural and Biological Engineering*. BS, 1959, MS, 1964, Clemson University; PhD, Mississippi State University, 1972; PE
- Willingham, Russell**, *Instructor, Languages*. BA, Clark College, 1963; MA, Atlanta University, 1966
- Willoughby, Deborah F.**, *Associate Professor, School of Nursing*. BS, 1976, MS, 1986, Clemson University; PhD, Georgia State University, 1995
- Wills, William**, *Adjunct Assistant Professor, Entomology, Soils, and Plant Sciences*. BS, Fresno State College-Bakersfield Center, 1959; MS, Pennsylvania State University, 1965
- Wilson, Kathleen K.**, *Research Associate/Professor, Family and Neighborhood Life*. BA, Moody Bible College, 1970; MEd, Texas Woman's University, 1970; PhD, Michigan State University, 1978
- Winchell, Donna H.**, *Professor, English*. BA, 1974, MA, 1976, Florida State University; PhD, Texas Christian University, 1983
- Winchell, Mark R.**, *Professor, English*. BA, 1971, MA, 1973, West Virginia University; PhD, Vanderbilt University, 1978
- Winters, Alan J.**, *Professor, School of Accountancy and Legal Studies*. BS, 1966, MBA, 1970, Northeast Louisiana University; PhD, Texas Technical University, 1974; CPA
- Wise, Mildred Alley**, *Lecturer, Teacher Education*. BS, Southern Wesleyan University, 1987; MEd, Clemson University, 1995
- Witte, James C.**, *Associate Professor, Sociology*. BA, Beloit College, 1979; MPA, University of Wisconsin, 1981; MA, 1984, PhD, 1991, Harvard University
- Wohn, Mary Jacqueline**, *Lecturer, School of Nursing*. BS, Skidmore College, 1982; MS, Clemson University, 1990
- Wolak, Francis J.**, *Associate Dean of Extension, Field Operations; Professor, Agricultural and Biological Engineering*. BS, 1976, PhD, 1981, Michigan State University
- Wolf, Jack G.**, *Assistant Professor, Finance*. BA, University of Virginia, 1991; MBA, Wake Forest University, 1993; PhD, University of Utah, 2000
- Wood, Gene W.**, *Professor, Forestry and Natural Resources*. BS, Virginia Polytechnic Institute and State University, 1963; MS, 1966, PhD, 1971, Pennsylvania State University
- Wood, Judy D.**, *Assistant Professor, Mechanical Engineering*. BS, 1981, MS, 1983, PhD, 1992, Virginia Polytechnic Institute and State University
- Woodard, James D.**, *Named Professor, Political Science*. BS, Abilene Christian University, 1970; MA, American University, 1973; PhD, Vanderbilt University, 1978
- Woodell, Charles H.**, *Professor, English*. BA, 1963, MA, 1964, Wake Forest University; PhD, University of North Carolina, 1974
- Woodward, Sandra K.**, *Lecturer, Chemical Engineering*. BA, Clemson University, 1967
- Woodward, Steven Paul**, *Assistant Professor, English*. BA, Queen's University (Canada), 1985; BAA, Ryerson Polytechnical University (Canada), 1990; MA, 1992, PhD, 2001, University of Toronto (Canada)
- Woodward-Detrich, Denise C.**, *Director, Rudolph E. Lee Gallery; Lecturer, Art*. BFA, Wichita State University, 1990; MFA, Alfred University, 1992
- Woolbright, Nona L.**, *Assistant Professor, Graphic Communications*. BA, California State University-Chico, 1983; MS, Central Missouri State University, 1986; EdD, Clemson University, 1995
- Wooten, Thomas E.**, *Alumni Professor, Forestry and Natural Resources*. BA, Catawba College, 1962; MEd, Duke University, 1965; PhD, North Carolina State University, 1967
- Worthen, Wade B.**, *Adjunct Associate Professor, Biological Sciences*. BS, Bucknell University, 1982; MS, 1985, PhD, 1988, Rutgers University
- Wourms, John P.**, *Professor, Biological Sciences*. BS, 1958, MS, 1960, Fordham University; PhD, Stanford University, 1966
- Wright, Brett A.**, *Department Chair and Professor, Parks, Recreation, and Tourism Management*. BA, 1975, MA, 1976, Morehead State University; PhD, Texas A&M University, 1985
- Wright, Julia S.**, *Lecturer, Teacher Education*. BA, 1975, MA, 1976, Morehead State University
- Wueste, Daniel E.**, *Director, Rutland Center for Ethics; Associate Professor, Philosophy and Religion*. BA, 1976, MA, 1979, University of Wisconsin; PhD, Washington University, 1985
- Wyatt, Douglas E.**, *Adjunct Assistant Professor, School of the Environment*. BA, University of Tennessee, 1980; MS, Vanderbilt University, 1985; PhD, University of South Carolina, 1995
- Wyffels, Jennifer T.**, *Adjunct Assistant Professor, Biological Sciences; Adjunct Assistant Professor, Animal and Veterinary Sciences*. BS, Bradley University, 1991; PhD, Clemson University, 2001
- Xie, Yuan**, *Research Associate/Assistant Professor, Chemistry*. BS, 1978, MS, 1986, Suzhou University (China); PhD, Shanghai Institute of Organic Chemistry, 1990
- Xu, Xiao-hang**, *Associate Professor, Electrical and Computer Engineering*. BS, Tsinghua University (China), 1968; PhD, University of Mississippi, 1985
- Yancey, Kathleen B.**, *Director, Pearce Center; Roy Pearce Professor, Professional Communications*. BA, 1972, MA, 1977, Virginia Polytechnic Institute and State University; PhD, Purdue University, 1983
- Yarrow, Greg K.**, *Professor, Forestry and Natural Resources*. BS, University of Southern Mississippi, 1977; MS, Mississippi State University, 1979; DE, Stephen F. Austin State University, 1987
- Yilmaz, Umit**, *Associate Professor, Planning and Landscape Architecture*. BArch, 1979, MA, 1981, PhD, 1988, Istanbul Technical University (Turkey)
- Yin, Jing**, *Assistant Professor, Communication Studies*. BA, Beijing Broadcasting Institute (China), 1997; MA, University of New Mexico, 2000; PhD, Pennsylvania State University, 2003
- Yoon, Tae-hee**, *Adjunct Professor, Applied Economics and Statistics*. LLB, Dong Guk University (Korea), 1959; MPA, Seoul National University (Korea), 1964; PhD, University of Connecticut, 1967
- Young, Arthur P.**, *Campbell Chair and Professor, English and Engineering*. BA, University of Maryland, 1966; MA, 1968, PhD, 1971, Miami University
- Yu, Xianzhong**, *Assistant Professor, Biological Sciences*. BS, Laiyang Agricultural College (China), 1985; MS, Changchun University (China), 1988; PhD, Ohio University, 1998
- Zaczek, Barbara M.**, *Associate Professor, Languages*. BA, University of Krakow (Poland), 1972; MA, 1988, PhD, 1992, University of Oregon
- Zehnder, Geoffrey W.**, *Coordinator, Integrated Pest Management and Sustainable Agriculture; Professor, Entomology, Soils, and Plant Sciences*. BS, University of California-Davis, 1976; MS, 1980; PhD, 1984, University of California-Riverside
- Zhang, Dalun**, *Assistant Professor, Teacher Education*. BA, 1983, MA, 1987, East China Normal University (China); MEd, 1994, PhD, 1998, University of New Orleans
- Zhang, Yanhua**, *Assistant Professor, Languages*. BA, Beijing Normal University (China), 1983; MA, Chinese Academy of Social Sciences (China), 1986; MA, 1992, PhD, 1999, University of Hawaii
- Zile, Michael R.**, *Adjunct Professor, Bioengineering*. BA, Knox College, 1974; MD, Rush University, 1977

Zillante, George, *Adjunct Professor, Construction Science and Management*, BArch, South Australian Institute of Technology, 1975; MS, University of South Australia (Australia), 1997

Zumbrunnen, David A., Warren H. Owen-Duke Energy Professor, Mechanical Engineering, BME, University of Minnesota, 1977; MSME, 1984, PhD, 1988, Purdue University; PE

Zungoli, Patricia A., *Professor, Entomology, Soils, and Plant Sciences*, BS, 1974, MS, 1979, University of Maryland; PhD, Virginia Polytechnic Institute and State University, 1982

FACULTY EMERITI

Acker, Thomas Waring, BS, *County Extension Agent Emeritus*

Ackerman, Carl Willis, MS, *Professor Emeritus of Animal Science*

Acorn, John Thomson, MFA, *Chair and Professor Emeritus of Art*

Adair, Joseph Henry, MEd, *Professor Emeritus of Education*

Addison, Clarence Lee Benjamin, MArch, *Professor Emeritus of Construction Science and Management*

Aitken, James Bruce, PhD, *Professor Emeritus of Horticulture*

Alam, Khursheed, PhD, *Professor Emeritus of Mathematical Sciences*

Albert, Harold Edward, PhD, *Professor Emeritus of Political Science*

Albrecht, John E., PhD, *Professor Emeritus of Animal and Veterinary Sciences*

Allen, Joe Frank, PhD, *Professor Emeritus of Chemistry*

Allen, Leonard Ray, PhD, *Professor Emeritus of Agronomy and Soils*

Allen, Robert Max, PhD, *Professor Emeritus of Forest Resources*

Alley, Forrest Christopher, PhD, *Professor Emeritus of Chemical Engineering*

Alphin, John Gilbert, PhD, *Professor Emeritus of Agricultural and Biological Engineering*

Alston, Rowland Poole, Jr., MS, *County Extension Agent Emeritus*

Anand, Vera Barata, MS, *Professor Emerita of Engineering Graphics*

Anderson, Luther Perdue, PhD, *Dean Emeritus, College of Agricultural Sciences; Professor Emeritus of Agronomy and Soils*

Armistead, Myra Ann, MA, *Professor Emerita of Libraries*

Arnold, Edwin Pratte, MA, *Professor Emeritus of German*
Ashley, Kathy Littlefield, MS, *County Extension Agent Emerita*

Aucouin, Claire Russell, MS, *Professor Emerita of Mathematical Sciences*

Aucouin, Clayton Verl, PhD, *Professor Emeritus of Mathematical Sciences*

Bagby, Sara Ayers, PhD, *Professor Emerita of Home Economics*

Bailey, Roy Horton, Jr., PhD, *Professor Emeritus of Chemistry*

Baird, Betty Evans, MS, *County Extension Agent Emerita*

Balk, William Armstrong, MS, *Professor Emeritus of Agricultural and Biological Engineering, Edisto Experiment Station*

Banister, Robert Allen, MS, *Director Emeritus of Cooperative Education; Professor Emeritus of Engineering Graphics*

Barlage, William Berdell, Jr., PhD, *Associate Dean Emeritus, College of Engineering; Professor Emeritus of Chemical Engineering*

Barnett, Bobby Dale, PhD, *Professor Emeritus of Poultry Science*

Barnhill, James Wallace, MA, *Professor Emeritus of History*

Baron, William, PhD, *Professor Emeritus of Civil Engineering*

Barron, Charles Henson, DSc, *Professor Emeritus of Chemical Engineering*

Barth, Clyde Lewis, PhD, *Professor Emeritus of Agricultural and Biological Engineering*

Bass, Samuel David, *County Extension Agent Emeritus*

Bauld, Nelson Robert, Jr., PhD, *Professor Emeritus of Mechanical Engineering and Engineering Mechanics*

Baumgardner, Reginald Andrew, PhD, *Professor Emeritus of Horticulture*

Baxter, Ann Webster, PhD, *Professor Emerita of Microbiology*

Bayles, Allen Eugene, EdD, *Extension Associate Emeritus*

Beard, John Nelson, Jr., PhD, *Professor Emeritus of Chemical Engineering*

Beckwith, William Frederick, PhD, *Professor Emeritus of Chemical Engineering*

Bchery, Hassan Mohamed, PhD, *Professor Emeritus of Textiles*

Bennett, Archie Wayne, PhD, *Senior Vice Provost and Dean Emeritus of Graduate School; Professor Emeritus of Electrical and Computer Engineering*

Bennett, John Everett, PhD, *Professor Emeritus of Electrical and Computer Engineering*

Berger, Leonard, PhD, *Professor Emeritus of Psychology*

Beyerlein, Adolph Louis, PhD, *Chair and Professor Emeritus of Chemistry*

Biga, Thomas Michael, MS, *County Extension Agent Emeritus*

Bishop, Carl Barnes, PhD, *Professor Emeritus of Chemistry*

Bishop, Eugene Harlan, PhD, *Alumni Professor Emeritus of Mechanical Engineering*

Bishop, Muriel Boyd, PhD, *Professor Emerita of Chemistry*

Black, John Olar, MS, *Professor Emeritus of Agronomy and Soils*

Black, Jonathan, PhD, *Professor Emeritus of Bioengineering*
Blanton, Lloyd Houston, PhD, *Acting Head and Professor Emeritus of Agricultural Education*

Bleser, Carol, PhD, *Calhoun Lemon Professor Emerita of History*

Book, Norman Loyd, PhD, *Professor Emeritus of Construction Science and Management*

Bookmyer, Beverly Brandon, PhD, *Professor Emerita of Physics and Astronomy*

Boone, James Edward, BS, *County Extension Agent Emeritus*

Borgman, Robert Frederic, PhD, *Professor Emeritus of Food Science*

Bosdell, Francis Alvin, MInEd, *Professor Emeritus of Industrial Education*

Bose, Anil Kumar, PhD, *Professor Emeritus of Mathematical Sciences*

Boswell, John Smith, Jr., *County Extension Agent Emeritus*

Box, Benton Holcombe, DF, *Dean Emeritus of College of Forest and Recreation Resources; Professor Emeritus of Forest Resources*

Bradbury, Douglas Wilson, MSE, *Alumni Professor Emeritus of Mechanical Engineering*

Bradford, Garnett Lowell, PhD, *Professor Emeritus of Agricultural and Applied Economics*

Brannock, Durant York, Jr., MA, *Professor Emeritus of French*

Brantley, Herbert, PhD, *Head and Professor Emeritus of Parks, Recreation, and Tourism Management*

Briscoe, Ida Carolyn, EdD, *Professor Emerita of Curriculum and Instruction*

Brittain, Jerle Alonzo, PhD, *Professor Emeritus of Horticulture and Integrated Pest Management*

Brock, Julia Ashley, *County Extension Director Emerita*

Brooks, Afton DeWayne, EdD, *Professor Emeritus of Curriculum and Instruction*

Brown, Bennie Mae Porter, MEd, *County Extension Agent Emerita*

Brown, Carolyn Scurry, PhD, *Professor Emerita of Biochemistry*

Brown, Farrell Blenn, PhD, *Interim Dean Emeritus of Graduate School; Professor Emeritus of Chemistry*

Brown, Thomas M., PhD, *Professor Emeritus of Entomology*

Brown, William Glynn, Jr., PhD, *Professor Emeritus of Animal, Dairy, and Veterinary Sciences*

Bryan, Edward Lewis, DBA, *Professor Emeritus of Accounting*

Bryan, James Woodrow, DVM, *Director Emeritus of Lake-Stock Poultry Health*

Buckner, Sam Levi, EdD, *Professor Emeritus of Curriculum and Instruction*

Bunn, Joe Millard, PhD, *Chair and Professor Emeritus of Agricultural and Biological Engineering*

Burch, Elmer Earl, Jr., PhD, *Professor Emeritus of Business Administration and Mathematical Sciences*

Burkett, Byron Verner, Jr., PhD, *Professor Emeritus of Technology and Human Resource Development*

Bussey, Marie Martin, *County Extension Agent Emerita*

Butler, John Harrison, EdD, *Head and Professor Emeritus of Music*

Butler, John Kenrick, Jr., DBA, *Professor Emeritus of Management*

Byars, Edward Ford, PhD, *Executive Assistant Emeritus to the President; Professor Emeritus of Mechanical Engineering and Engineering Mechanics*

Caley, Paul Cochran, PhD, *Professor Emeritus of Industrial Education*

Calhoun, Richard James, PhD, *Alumni Professor Emeritus of English*

Campbell, Alice Young, MS, *County Extension Agent Emerita*

Card, Edith Bryson, PhD, *Professor Emerita of Music*

Carpenter, Earl Thomas, EdD, *Head and Professor Emeritus of Agricultural Education*

Carroll, June Langley, BS, *District Extension Director Emerita*

Caskey, Claire Omar, MA, *Professor Emeritus of English*

Castro, Walter Ernest, PhD, *Professor Emeritus of Mechanical Engineering and Engineering Mechanics*

Cely, Joseph Eugene, MS, *County Extension Agent Emeritus*

Caplin, Robert Lee, Jr., PhD, *Professor Emeritus of Physics*

Cheatham, Samuel Augustus, MA, *County Extension Agent Emeritus*

Chisman, James Allen, PhD, *Professor Emeritus of Industrial Engineering*

Cholewinski, Frank Michael, PhD, *Professor Emeritus of Mathematical Sciences*

Christenbury, Gerald Davis, PhD, *Professor Emeritus of Agricultural and Biological Engineering*

Christenbury, Joyce Hvrol, MEd, *Professor Emerita of Family and Youth Development*

Christoph, Laverne McKay, MA, *Professor Emeritus of English*

- Claire, Alison L., PhD, Professor Emerita of Accounting
- Clark, James Edwin, PhD, Professor Emeritus of Civil Engineering
- Clements, Stanley Gordon, Jr., Distinguished Area County Agent Emeritus
- Clinkscales, William Cherry, EdD, Assistant Director of Extension Emeritus
- Coffeen, William W., PhD, Professor Emeritus of Ceramic Engineering
- Colburn, Frances Louise, MLS, Head and Librarian Emerita of Circulation Unit
- Cole, Spurgeon Northen, PhD, Professor Emeritus of Psychology
- Collins, Joyce Smith, County Extension Agent Emerita
- Collins, Thomas Frank, MS, Professor Emeritus of Physics and Astronomy
- Connor, Anthony Cooper, MA, Professor Emeritus of Computer Science
- Conover, Richard Allan, Jr., PhD, Professor Emeritus of Parks, Recreation, and Tourism Management
- Cook, Bruce Farrell, PhD, Director Emeritus of the Brooks Center, Professor Emeritus of Music
- Cook, Wilton Pierce, PhD, Professor Emeritus of Horticulture
- Cooleedge, Harold Norman, Jr., PhD, Professor Emeritus of Architectural History
- Copeland, Jimmy Bryant, PhD, Associate Director Emeritus of Cooperative Extension Service; Professor Emeritus of Agricultural Economics and Rural Sociology
- Coulter, Edwin Martin, PhD, Professor Emeritus of Political Science
- Cox, Headley Morris, PhD, Dean Emeritus, College of Liberal Arts; Professor Emeritus of English
- Craddock, Garnet Roy, PhD, Professor Emeritus of Agronomy and Soils
- Crawley, Kelly Wayne, PhD, Professor Emeritus of Sociology
- Craig, James Telford, MS, Professor Emeritus of Agricultural and Biological Engineering
- Cranston, Mechthild, PhD, Professor Emerita of French
- Craven, Ruby Mae, PhD, State Leader Emerita of Extension Home Economics Programs; Professor Emerita of Home Economics
- Crosby, Margaree Seawright, EdD, Professor Emerita of Curriculum and Instruction
- Crouch, James Page, EdD, Alumni Distinguished Professor Emeritus of Graphic Communications
- Culbertson, Carroll Preston, BS, Extension Regional Director Emeritus
- Culler-Hair, Margaret Ann, MS, County Extension Agent Emerita
- Cunningham, Bennie Lee, MS, Professor Emeritus of Agricultural Education
- Davenport, John Douglas, PhD, Professor Emeritus of Psychology
- Davies, Brian Ewart, PhD, Professor Emeritus of Geological Sciences
- Davis, James Richard, PhD, Professor Emeritus of Accounting
- Davis, Rose Jones, EdD, Professor Emerita of Family and Youth Development
- Davis, Ruby Sellers, MA, Professor Emerita of History
- Day, Frank Louis, MA, Professor Emeritus of English
- Day, Mary Sue, BS, County Extension Agent Emerita
- Deal, Elwyn Ernest, PhD, Assistant Director Emeritus for Extension and Research
- Dean, Jordan Arthur, MA, Professor Emeritus of Modern Languages
- Dickerson, Ottie Joseph, PhD, Head and Professor Emeritus of Plant Pathology and Physiology; State Plant Pathologist
- Dickey, Joseph Freeman, PhD, Alumni Professor Emeritus of Animal, Dairy, and Veterinary Sciences
- Dieffendorf, Russell Judd, PhD, McAlister Professor Emeritus of Ceramic Engineering
- Dillman, Buddy Leroy, PhD, Professor Emeritus of Agricultural and Applied Economics
- Dillon, Charles Ronald, PhD, Professor Emeritus of Botany
- Dillon, Howard, Jr., BS, County Extension Agent Emeritus
- Dinger, Dennis Russell, PhD, Professor Emeritus of Ceramic and Materials Engineering
- Dixon, Marvin Warren, PhD, Alumni Distinguished Professor Emeritus of Mechanical Engineering
- Doruk, Teoman Kaya, DEng, Professor Emeritus of Architecture
- Drew, Leland Overby, PhD, Professor Emeritus of Engineering Technology
- Duke, Albert Link, PhD, Professor Emeritus of Electrical and Computer Engineering
- Dukes, Geraldine Dorman, MEd, Extension Regional Director Emerita
- Dunn, Charles Wythe, PhD, Professor Emeritus of Political Science
- DuRant, John Alexander III, PhD, Professor Emeritus of Entomology
- Durham, Bill Gravely, MEd, Professor Emeritus of Spanish
- Eaddy, Elvie Eskew, County Extension Agent Emerita
- Eaddy, Susan Tomlinson, BS, Distinguished County Agent Emerita
- Eargle, Jesse Claude, MS, Extension Regional Director Emeritus
- Edwards, James Leon, MS, Assistant Dean Emeritus, College of Engineering; Professor Emeritus of Mechanical Engineering
- Edwards, Jane Snipes, County Extension Agent Emerita
- Edwards, Robert Lee, PhD, Professor Emeritus of Animal Science
- Efland, Thomas Daniel, MS, Associate Dean and Director Emeritus of Research of the College of Commerce and Industry; Professor Emeritus of Textiles
- Eflin, Robert Dean, MArch, Professor Emeritus of Architecture
- Egan, Martin David, MS, Professor Emeritus of Construction Science and Management
- Elrod, Alvon Creighton, PhD, Professor Emeritus of Mechanical Engineering
- Ensor, Janet Elizabeth, BS, County Extension Agent Emerita
- Epps, Philip Olin, Area County Extension Agent Emeritus
- Epps, William Monroe, PhD, State Pathologist Emeritus; Head of Professor Emeritus of Plant Pathology and Physiology
- Eskew, Elias Benton, MS, Professor Emeritus of Agronomy and Soils
- Eubanks, Isaac Dwaine, PhD, Professor Emeritus of Chemistry
- Evans, John Stephen, BS, Head Emeritus of Farms Department; Professor Emeritus of Agricultural and Biological Engineering
- Ezell, Dan Odell, PhD, Associate Director of Extension Emeritus
- Fain, Charles Clifford, PhD, Professor Emeritus of Ceramic Engineering
- Fairey, John Edward III, PhD, Professor Emeritus of Biological Sciences
- Falk, Edward Lockwood, DPA, Professor Emeritus of Planning Studies
- Fallow, Jeralyn Kirkley, County Extension Agent Emerita
- Fanning, James Collier, PhD, Professor Emeritus of Chemistry
- Faris, Jesse Edwin, PhD, Director Emeritus, International Programs of Agricultural and Natural Resources; Head and Professor Emeritus of Agricultural Economics and Rural Sociology
- Felder, Herman McDonald, Jr., MA, Professor Emeritus of English
- Fendley, Timothy Thomas, PhD, Professor Emeritus of Aquaculture, Fisheries, and Wildlife
- Fernandez, Elena Gonzales, BA, Professor Emerita of Spanish
- Fernandez, Gaston Juan, PhD, Professor Emeritus of Spanish
- Fitch, Lewis Thomas, PhD, Alumni Professor Emeritus of Electrical and Computer Engineering
- Fitzsimons, Frank Lockwood III, MS, County Extension Agent Emeritus
- Foley, Charles William, PhD, Professor Emeritus of Animal and Veterinary Sciences
- Fones, Shelley White, PhD, Professor Emerita of Elementary and Early Childhood Education
- Foster, Carolyn Ezell, MA, Professor Emerita of English
- Foster, Ida Marie Sloan, MSLS, Librarian Emerita
- Fox, Richard Charles, PhD, Professor Emeritus of Entomology
- Franklin, Joyce Byrd, MS, County Extension Agent Emerita
- Frederick, John Arthur, MS, County Extension Agent Emeritus
- Freeman, Edwin Armistead, PhD, Professor Emeritus of Music
- Fuhr, Donald Lee, EdD, Professor Emeritus of Counseling and Educational Leadership
- Fulmer, John Patrick, MS, Professor Emeritus of Horticulture
- Gable, Paul Kistler, Jr., BA, Assistant Director of Extension Emeritus
- Gadson, Tyron, BS, County Extension Agent Emeritus
- Galloway, Elizabeth Boyce, EdD, Alumni Distinguished Professor Emerita of Education
- Galluscio, Eugene Hugo, PhD, Professor Emeritus of Psychology
- Garner, Thomas Harold, PhD, Professor Emeritus of Agricultural and Biological Engineering
- Garrison, Olen Branford, PhD, Director Emeritus of Agricultural Experiment Station and Research in Agriculture; Professor Emeritus of Horticulture
- Gaskins, Judith Collins, MS, County Extension Agent Emerita
- Geldard, John Francis, PhD, Professor Emeritus of Chemistry
- Gettys, William Edward, PhD, Professor Emeritus of Physics
- Gilchrist, Ralph Wayne, PhD, Professor Emeritus of Electrical and Computer Engineering
- Gilliland, Bobby Eugene, PhD, Special Assistant Emeritus to the President; Professor Emeritus of Electrical and Computer Engineering
- Gilreath, John Atkins, MS, Professor Emeritus of Physics
- Glick, Bruce, PhD, Head and Professor Emeritus of Poultry Science
- Glover, Judith Lyles, BA, County Extension Agent Emerita
- Godley, Willie Cecil, PhD, Associate Dean Emeritus, College of Agricultural Sciences; Director Emeritus, Agricultural Experiment Station; Professor Emeritus of Animal Science
- Goree, James Gleason, PhD, Centennial Professor Emeritus; Professor Emeritus of Mechanical Engineering and Engineering Mechanics
- Gossett, Billy Joe, PhD, Professor Emeritus of Crop and Soil Environmental Science

- Goswami, Dixie Gooch, MA, Professor Emerita of English
- Graben, Henry Willingham, PhD, Professor Emeritus of Physics
- Grady, C. P. Leslie, Jr., PhD, R. A. Boven Professor Emeritus of Environmental Engineering and Science
- Gray, Charles Harmon, BA, County Extension Agent Emeritus
- Gray, Furman Ray, MS, Associate Professor Emeritus of Accounting
- Gray, Gordon Walter, EdD, Dean Emeritus, College of Education
- Gregory, Kay Rish, County Extension Agent Emerita
- Griffin, Barbara Jean, MA, Professor Emerita of Agricultural and Biological Engineering
- Griffin, Deuel Norton, MAT, Professor Emeritus of English
- Griffin, Randall Parrish, MS, Professor Emeritus of Entomology
- Griffin, Villard Stuart, Jr., PhD, Professor Emeritus of Geology
- Haertling, Gene Henry, PhD, Bishop Distinguished Professor Emeritus of Ceramic Engineering
- Hall, Basil Edwin, MEd, Professor Emeritus of Art
- Hamby, John Vernon, PhD, Professor Emeritus of Education
- Hamilton, Max Greene, PhD, Professor Emeritus of Horticulture, Edisto Research and Education Center
- Hammond, Alexander Francis, MS, Professor Emeritus of Engineering Technology
- Hammond, Joseph Langhorne, PhD, Professor Emeritus of Electrical and Computer Engineering
- Handlin, Dale Lee, MS, Professor Emeritus of Animal Science
- Hardin, Thurman Craig, PhD, Professor Emeritus of Mechanical Engineering
- Harris, Carolyn Martin, MS, County Extension Agent Emerita
- Harris, Maureen, MLS, Professor Emerita of Libraries
- Harrison, James William, Jr., PhD, Professor Emeritus of Electrical and Computer Engineering
- Hart, Lillian Blake, PhD, Professor Emerita of Curriculum and Instruction
- Harvey, Lawrence Harmon, PhD, Professor Emeritus of Agronomy and Soils
- Harwell, Richard Lynn, PhD, Professor Emeritus of Agricultural and Applied Economics
- Haselton, George Montgomery, PhD, Professor Emeritus of Geology
- Hash, John Alex, EdD, Professor Emeritus of Agricultural Education
- Hann, Joseph Rhodes, PhD, Professor Emeritus of Horticulture
- Haymond, Jacqueline Landis, PhD, Professor Emerita of Forest Resources
- Haymond, Robert Edward, PhD, Professor Emeritus of Mathematical Sciences
- Hays, Ruth Lanier, PhD, Professor Emerita of Biological Sciences
- Hays, Sidney Brooks, PhD, Head and Professor Emeritus of Entomology
- Hegg, Richard Olaf, PhD, Professor Emeritus of Agricultural and Biological Engineering
- Helms, Carl Wilbert, PhD, Professor Emeritus of Zoology
- Hendrix, William Herlie, PhD, Head and Professor Emeritus of Management
- Hendrix, William Judson, MS, County Extension Agent Emeritus
- Henricks, Donald Maurice, PhD, Chair and Professor Emeritus of Animal and Veterinary Sciences
- Henry, Louis Lee, PhD, Professor Emeritus of English
- Hill, James Riley, Jr., PhD, Professor Emeritus of Animal Dairy, and Veterinary Sciences
- Hiller, Howard Hugh, MS, County Extension Agent Emeritus
- Hillman, Dannela Valentine, County Extension Agent Emerita
- Hioit, Floyd Berry, Jr., BS, County Extension Agent Emeritus
- Hippes, Opal Shepard, EdD, Professor Emerita in School of Nursing
- Hite, James Cleveland, PhD, Alumni Professor Emeritus of Agricultural and Applied Economics
- Hobson, James Harvey, PhD, Alumni Professor Emeritus of Chemistry
- Hochheimer, Laura, PhD, Professor Emerita of Music
- Hodges, Barbara Latimer, MEd, County Extension Agent Emerita
- Holahan, Ursula Ann, MS, Professor Emerita of Home Economics
- Holmes, Paul Thayer, PhD, Professor Emeritus of Mathematical Sciences
- Holt, Albert Hamilton, PhD, Professor Emeritus of English
- Hon, David N.-S., PhD, Professor Emeritus of Forest Resources
- Hood, Clarence Elam, Jr., PhD, Professor Emeritus of Agricultural and Biological Engineering
- Hook, Donald Delose, PhD, Professor Emeritus of Forestry
- Horton, Paul Mackey, PhD, Professor and Assistant Director of Extension Emeritus
- House, Verne Wasden, PhD, Professor Emeritus of Agricultural and Applied Economics
- Howell, Nelda Kay, MEd, Professor Emerita of Home Economics
- Hubbard, John William, PhD, Professor Emeritus of Agricultural Economics and Rural Sociology
- Hubbard, Julius Clifford, Jr., MS, Alumni Professor Emeritus of Textiles
- Hudson, Larry Wilson, PhD, Professor Emeritus of Animal and Veterinary Sciences
- Hudson, Mark Richards, MFA, Professor Emeritus of Art
- Hudson, William Garraux, MS, Professor Emeritus of Mechanical Engineering
- Hughes, Buddy Lee, PhD, Professor Emeritus of Animal and Veterinary Sciences
- Hughes, Robbie Blankenship, EdD, Professor Emerita, School of Nursing
- Hunter, James Gerrard, Distinguished County Agent Emerita
- Hunter, Oren Franklin, Sr., MS, Professor Emeritus of Textiles, Fiber, and Polymer Science
- Hunter, Robert Howard, MFA, Professor Emeritus of Visual Arts
- Hurst, Victor, PhD, Vice President Emeritus of Academic Affairs and Dean of the University, Dean Emeritus of the Graduate School; Alumni Professor Emeritus of Dairy Science
- Hutton, Dale Jovan, MArch, Professor Emeritus of Architecture
- Idol, John Lane, Jr., PhD, Alumni Professor Emeritus of English
- Jackson, Herman Brown, Jr., PhD, Department Head of Plant Industry Emeritus
- Jacques, John David, MPhil, Professor Emeritus of Architecture
- Jansen, Jacob John, PhD, Professor Emeritus of Dairy Science
- Jenkins, Gloria, MS, County Extension Agent Emerita
- Jensen, Arthur Kenneth, PhD, Professor Emeritus of Vocational-Technical Education
- Johnson, Ruby Carolyn, MS, County Extension Agent Emerita
- Jones, Champ McMillian, PhD, Professor Emeritus of Agronomy and Soils
- Jones, Emory Valentine, MS, County Extension Director Emeritus
- Jones, Jack Edenfield, PhD, Professor Emeritus of Poultry Science
- Jones, Jess Willard, PhD, Associate Dean Emeritus, College of Agricultural Sciences, Professor Emeritus of Agronomy and Soils
- Jones, Joe Kenneth, BS, State Leader Emeritus of 4-H and Youth Development Programs, Professor Emeritus of Animal Science
- Jones, Thaddeus Murdaugh, BS, County Extension Agent Emeritus
- Jones, W. A., Jr., MA, County Extension Director Emeritus
- Jordan, Johnny Wayne, PhD, Professor Emeritus
- Josey, James Larry, PhD, Professor Emeritus of Civil Engineering
- Kanet, John Joseph, PhD, Professor Emeritus of Management
- Keener, John Leroy, Jr., County Extension Agent Emeritus
- Keesee, Lee Shirley, BS, County Extension Agent Emeritus
- Keller, Deloris Olivia, Distinguished County Agent Emerita
- Keller, Frederick Jacob, PhD, Professor Emeritus of Physics
- Kelly, Mary Ann, EdD, Professor Emerita of Nursing Science
- Kenelly, John Willis, PhD, Alumni Professor Emeritus of Mathematical Sciences
- Kennedy, William Joseph, PhD, Professor Emeritus of Industrial Engineering
- Kinder, Andrew Jackson, BA, County Extension Agent Emeritus
- King, Grady Ansel, Jr., PhD, Professor Emeritus of Horticulture
- Kingman, Alta Randall, PhD, Professor Emeritus of Horticulture
- Kingsland, Graydon Chapman, Sr., PhD, Professor Emeritus of Plant Pathology and Physiology
- Kirkwood, Charles Edward, Jr., MS, Professor Emeritus of Mathematical Sciences
- Kissam, John Benjamin, PhD, Professor Emeritus of Entomology
- Kline, Ellis Lee, PhD, Professor Emeritus of Microbiology and Molecular Medicine
- Kline, Judith Spiers, MS, Professor Emerita of Family and Youth Development
- Kline, Priscilla Mackenzie, EdD, Professor Emerita of Nursing Science
- Knapp, Ronald James, PhD, Alumni Professor Emeritus of Sociology
- Knox, Sarah Stewart, BS, Associate District Extension Leader Emerita; Professor Emerita of Home Economics
- Kopczyk, Ronald James, MSCE, Professor Emeritus of Engineering
- Kozma, Ernest Joseph, EdD, Professor Emeritus of Education
- Krohn, Glen Herbert, PhD, Assistant Director and Professor Emeritus of Family and Youth Development
- Labacki, Geraldine, EdD, Dean Emerita, College of Nursing; Professor Emerita of Nursing
- LaFleur, Kermi, PhD, Professor Emeritus of Agronomy and Soils
- Lambert, Barbara Sherrill, BS, County Extension Agent Emerita
- Lambert, Jerry Roy, PhD, Professor Emeritus of Agricultural and Biological Engineering

- Lambert, Robert Stansbury, PhD, Professor Emeritus of History
- Lander, Ernest McPherson, Jr., PhD, Alumni Professor Emeritus of History
- Lane, Carl Leaton, PhD, Professor Emeritus of Forestry
- Lane, Samuel, County Extension Agent Emeritus
- Larson, Richard Francis, PhD, Professor Emeritus of Sociology
- Lathrop, Jay Wallace, PhD, Professor Emeritus of Computer Engineering
- LaTorre, Donald Rutledge, PhD, Professor Emeritus of Mathematical Sciences
- LaTorre, Jewel Gillam, MA, Professor Emeritus of Mathematical Sciences
- Lazar, James Tarlton, Jr., PhD, Professor Emeritus of Dairy Science
- Leathrum, James Frederick, PhD, Professor Emeritus of Electrical and Computer Engineering
- Lee, Daniel Dixon, Jr., PhD, Professor Emeritus of Animal and Veterinary Sciences
- Lee, Peter Roald, MArch, Alumni Distinguished Professor Emeritus of Architecture
- Leemhuis, Roger Phillip, PhD, Professor Emeritus of History
- Lefort, Henry Gerard, PhD, Professor Emeritus of Ceramic Engineering
- Lester, Clarence Martin, BS, County Extension Agent Emeritus
- Leuschner, William Albert, PhD, Professor Emeritus of Forest Resources
- Lewis, Gordon, PhD, Professor Emeritus of Ceramic and Materials Engineering
- Ligon, James Teddie, PhD, Professor Emeritus of Agricultural and Biological Engineering
- Ling, Robert Francis, PhD, Professor Emeritus of Mathematical Sciences
- Locke, Ernest Lyle, County Extension Agent Emeritus
- Long, Jim Thomas, PhD, Professor Emeritus of Electrical and Computer Engineering
- Louderback, Joseph Girard, PhD, Professor Emeritus of Accounting
- Lovedahl, Gerald Grey, PhD, Professor Emeritus of Technology and Human Resource Development
- Loyd, Max Ira, PhD, Professor Emeritus of Agricultural and Applied Economics
- Lukawecki, Stanley Michael, PhD, Professor Emeritus of Mathematical Sciences
- Lumpkin, Oliver Reese, PhD, Professor Emeritus of Education
- Macauley, Hugh Holleman, Jr., PhD, Alumni Professor Emeritus of Economics and Management
- Macy, Jacques Berr, MAT, Professor Emeritus of French
- Maertens, Thomas Brock, MS, Professor Emeritus of Management
- Manwiller, Alfred, PhD, Professor Emeritus of Agronomy and Soils, Pee Dee Experiment Station
- Marbut, Samuel Alexander, BS, Professor Emeritus of Forestry
- Martin, John Campbell, PhD, Professor Emeritus of Electrical and Computer Engineering
- Martin, Mary Virginia, MA, Extension Associate Emerita
- Martini, Joseph Albert, PhD, Professor Emeritus of Botany Agronomy and Soils
- Marullo, Nicasio Philip, PhD, Professor Emeritus of Chemistry
- Marvin, John Henry, Jr., MS, Professor Emeritus of Textiles
- Mathews, Andrew Clark, PhD, Professor Emeritus of Botany
- Mathis, Lee Terrell, Jr., Distinguished County Agent Emeritus
- Matthews, James Edward, EdD, Dean Emeritus, College of Education; Professor Emeritus of Education
- Mathewson, Charles, PhD, Chair and Professor Emeritus of Construction Science and Management
- Maurer, Donald Edwin, EdD, Professor Emeritus of Industrial Education
- Mazur, Anthony Robert, PhD, Professor Emeritus of Crop and Soil Environmental Science
- McClain, Eugene Frederick, PhD, Professor Emeritus of Agronomy and Soils
- McCollough, Joe Lawrence, PhD, Professor Emeritus of Philosophy
- McConnell, James Calvin, Jr., PhD, Professor Emeritus of Animal and Veterinary Sciences
- McCorkle, Linda Harris, BS, County Extension Agent Emerita
- McCormac, Jack Clark, LLd, Alumni Professor Emeritus of Civil Engineering
- McCutchen, Alan Johnstone, CE, Professor Emeritus of Civil Engineering
- McDaniel, Martha Huggins, Area County Extension Agent Emerita
- McDowell, Helen Camp, BA, County Extension Agent Emerita
- McGe, Charles McKay, Jr., MA, Professor Emeritus of English
- McGregor, Rob Roy, Jr., PhD, Professor Emeritus of French and Latin
- McGregor, William Henry Davis, PhD, Dean Emeritus, College of Forest and Recreation Resources; Professor Emeritus of Forestry
- McKelvey, John Philip, PhD, Professor Emeritus of Physics
- McLaughlin, John Joseph, PhD, Professor Emeritus of English
- McLean, Edward Lee, PhD, Professor Emeritus of Agricultural and Applied Economics
- McLellan, Robert Wesley, PhD, Chair and Professor Emeritus of Parks, Recreation, and Tourism Management
- McNatt, Jo Ann, PhD, Professor Emerita of French
- Means, George Calvin, Jr., MArch, Professor Emeritus of Architecture
- Menke, Warren Wells, PhD, Professor Emeritus of Management
- Mercer, Robert Jack, EdD, Professor Emeritus of Agricultural Education
- Miller, Ansel Eldon, PhD, Professor Emeritus of Forest Resources
- Miller, Donald Piguot, PhD, Professor Emeritus of Physics
- Miller, James Cleo, Jr., PhD, State Extension Leader Emeritus
- Miller, Landon Carl, PhD, Professor Emeritus of Horticulture
- Miller, Robert Walker, Jr., PhD, Professor Emeritus of Plant Pathology and Physiology
- Miller, Yvonne Holliday, MS, Staff Development Specialist Emerita
- Mixon, Robert Floyd, MA, Professor Emeritus of Spanish
- Moran, Ronald Wesson, PhD, Associate Dean Emeritus, College of Architecture, Arts, and Humanities; Professor Emeritus of English
- Morgan, Harvey Eugene, Jr., EdD, Professor Emeritus of Industrial Education
- Morr, Charles Vernon, PhD, Stender Professor Emeritus of Food Science
- Mounter, Clyde Thompson, PhD, Professor Emeritus of Family and Youth Development
- Mullins, Joseph Chester, PhD, Professor Emeritus of Chemical Engineering
- Murrow, Elizabeth Jean, PhD, Professor Emerita of Nursing
- Nance, John William, BA, County Extension Agent Emeritus
- Newton, Alfred Franklin, EdD, Head and Professor Emeritus of Industrial Education
- Nicholson, James Harvey, MA, Professor Emeritus of Mathematical Sciences
- Nolan, Clifford Newell, PhD, Professor Emeritus of Agronomy and Soils
- Nunnery, Henry Grady III, MAg, County Extension Agent Emeritus
- Odom, Stephen, Jr., MS, County Extension Director Emeritus
- Ogle, Wayne LeRoy, PhD, Professor Emeritus of Horticulture
- Oglesby, Frances Madelynn, PhD, Professor Emerita of Nursing
- Olive, Edward Fleming, EdD, Professor Emeritus of Education
- Owens, Rameth Richard, PhD, Professor Emerita of History
- Owens, Walton Harrison, Jr., PhD, Professor Emeritus of Political Science
- Owings, Marvin Alpheus, PhD, Head and Professor Emeritus of English
- Oxendine, Laval, MS, County Extension Agent Emeritus
- Padgett, Adrian Lewis, MS, Professor Emeritus of Agricultural Economics and Rural Sociology, Pee Dee Research and Education Center
- Page, Norwood Rufus, PhD, Head Emeritus of Agricultural Chemical Services Department; Professor Emeritus of Agronomy and Soils
- Palmer, James Howell, PhD, Professor Emeritus of Agronomy and Soils
- Palmer, Merrill Craft, MA, Professor Emeritus of Mathematical Sciences
- Pardue, Fred Eugene, PhD, Professor Emeritus of Animal, Dairy, and Veterinary Sciences
- Pardue, John Cecile, Jr., BS, Area County Extension Agent Emeritus
- Parks, Clyde Leonard, PhD, Professor Emeritus of Agronomy and Soils
- Parks, Thomas Ilon, PhD, Professor Emeritus of Educational Leadership
- Pate, Dove Henry, Jr., EdD, Professor Emeritus of Technology and Human Resource Development
- Peck, John Charles, PhD, Professor Emeritus of Computer Science
- Pennscott, William Walter, EdD, Professor Emeritus of Education
- Perry, Robert Lindsay, MME, Professor Emeritus of Engineering Technology
- Pertuit, Alton Joseph, Jr., PhD, Professor Emeritus of Horticulture
- Pitner, John Bruce, PhD, Resident Director Emeritus, Pee Dee Research and Education Center; Professor Emeritus of Agronomy and Soils
- Platts, Rebecca Gaines, BA, County Extension Director Emerita
- Polk, George Merritt, Jr., MArch, Professor Emeritus of Architecture
- Porter, John Jefferson, PhD, Professor Emeritus of Textiles, Fiber, and Polymer Science
- Prevost, Aileen Sain, MN, Professor Emerita of Nursing
- Privette, Charles Victor, Jr., MS, Professor Emeritus of Agricultural and Biological Engineering
- Proctor, Thomas Gilmer, PhD, Professor Emeritus of Mathematical Sciences
- Ransom, Rosa Mitchell, MS, County Extension Agent Emerita

- Ray, John Robert, PhD, *Professor Emeritus of Physics and Astronomy*
- Reamer, Larry Donald, MS, *Professor Emeritus of Forestry*
- Redmann, Linda Louise, PhD, *Professor Emerita of Family and Youth Development*
- Reeves, Calvin Bright, MS, *Professor Emeritus of Dairy Science*
- Regnier, Ireland Goldsmith, MFA, *Professor Emeritus of Visual Arts*
- Rhodes, Billy Beryl, PhD, *Professor Emeritus of Horticulture*
- Rhodes, William Hancel, BS, *Superintendent Emeritus of Sandhill Experiment Station; Professor Emeritus of Horticulture*
- Rich, Linvil Gene, PhD, *Professor Emeritus of Environmental Systems Engineering*
- Richardson, Eleanor Joyce, MS, *Professor Emerita of Family and Youth Development*
- Richardson, Joel Landrum, MS, *Professor Emeritus of Industrial Management*
- Richardson, John Coakley, EdD, *Professor Emeritus of Special Education*
- Ridley, John Davis, MS, *Professor Emeritus of Horticulture*
- Rife, Lawrence Albert, MA, *Professor Emeritus of Mathematical Sciences*
- Riley, Barbara Brunson, *County Extension Agent Emerita*
- Risher, Charles Franklin, BS, *Professor Emeritus of Poultry Science*
- Roberson, Georgia Taylor, MED, *State 4-H and Youth Development Coordinator Emerita; Professor Emerita of Home Economics*
- Roberts, William Russell, MS, *Professor Emeritus of 4-H and Youth Development*
- Robinette, David Lamar, PhD, *Professor Emeritus of Forest Resources*
- Robinson, Lou Johnson, BA, *County Extension Agent Emerita*
- Robinson, Vernon Lee, PhD, *Professor Emeritus of Forest Resources*
- Rogers, Ernest Brasington, Jr., MS, *Professor Emeritus of Agricultural Education*
- Rogers, Hilton Vernard, MS, *Head Emeritus of Fertilizer Inspection Department; Professor Emeritus of Agronomy and Soils*
- Rollin, Lucy Waddey, PhD, *Professor Emeritus of English*
- Rollin, Roger Best, PhD, *Lemon Professor Emeritus of Literature*
- Rostron, Joseph Prugh, MCE, *Professor Emeritus of Civil Engineering*
- Roswal, Leon, MS, *Director and Professor Emeritus of Nursing*
- Ruckle, William Henry, PhD, *Professor Emeritus of Mathematical Sciences*
- Rudisill, Carl Sidney, PhD, *Professor Emeritus of Mechanical Engineering*
- Rudowski, Victor Anthony, PhD, *Professor Emeritus of English*
- Ruff, William James, BS, *County Extension Agent Emeritus*
- Ruggles, Janice Camlin, *County Extension Agent Emerita*
- Ruppert, Edward Ernst, PhD, *Professor Emeritus of Biological Sciences*
- Russell, Linda Latimer, MED, *Extension Regional Director Emerita*
- Russo, Kenneth John, MA, *Professor Emeritus of Architecture*
- Ryan, Daniel Leo, PhD, *Professor Emeritus of Engineering Graphics*
- Sabin, Guy Edward, MF, *Professor Emeritus of Forest Resources*
- Savitsky, George Boris, PhD, *Professor Emeritus of Chemistry*
- Sawyer, Corinne Holt, PhD, *Professor Emerita of English*
- Schmittow, Charles Daniel, EdS, *Professor Emeritus of Technology and Human Resource Development*
- Schwartz, Arnold Edward, PhD, *Dean Emeritus of Graduate School; Professor Emeritus of Civil Engineering*
- Schwartz, Carol Young, MSN, *Professor Emerita of Health Science*
- Scott, John Marshall, *County Extension Agent Emeritus*
- Screen, Arnold, BS, *County Extension Agent Emeritus*
- Sellers, Harold Calvin, BSIE, *Professor Emeritus of Computer Science*
- Senn, David James, PhD, *Professor Emeritus of Psychology*
- Senn, Louie Hampton, Jr., PhD, *Director Emeritus of Regulatory and Public Service Programs*
- Senn, Taze Leonard, PhD, *Head and Professor Emeritus of Horticulture*
- Seo, Kenzo, PhD, *Professor Emeritus of Mathematical Sciences*
- Shelton, Carole Anne, MS, *County Extension Agent Emerita*
- Sheriff, Jimmy Don, PhD, *Senior Associate Dean and Professor Emeritus of Accountancy*
- Sherill, Max Douglas, PhD, *Professor Emeritus of Physics*
- Shimel, William Alexander, PhD, *State Extension Leader Emeritus*
- Shively, Jessup MacLean, PhD, *Professor Emeritus of Biochemistry*
- Sias, Frederick Ralph, Jr., PhD, *Professor Emeritus of Electrical and Computer Engineering*
- Simms, John Barber, MA, *Professor Emeritus of English*
- Simon, Frederick Tyler, MS, *Professor Emeritus of Textile Science*
- Skardon, Beverly Norton, MA, *Professor Emeritus of English*
- Skelley, George Calvin, Jr., PhD, *Professor Emeritus of Animal Science*
- Skelton, Billy Ray, PhD, *Professor Emeritus of Economics*
- Skelton, Bobby Joe, PhD, *Vice Provost and Dean Emeritus of Admissions and Registration; Professor Emeritus of Horticulture*
- Skelton, Thomas Eugene, PhD, *Head and Professor Emeritus of Entomology*
- Skove, Malcolm John, PhD, *Alumni Professor Emeritus of Physics*
- Slann, Martin Wayne, PhD, *Chair and Professor Emeritus of Political Science*
- Smith, Claude, Jr., BS, *County Extension Agent Emeritus*
- Smith, Chester Roland, PhD, *Professor Emeritus of Industrial Management*
- Smith, Daniel Bruce, PhD, *Professor and Director of Extension Emeritus*
- Snell, Absalom West, PhD, *Associate Director Emeritus of Agricultural Experiment Station; Professor Emeritus of Agricultural Engineering*
- Snelshire, Robert William, PhD, *Professor Emeritus of Electrical and Computer Engineering*
- Snipes, David Strange, PhD, *Professor Emeritus of Geology*
- Sowell, Talley West, MS, *County Extension Agent Emerita*
- Spadoni, Rosemary Ann, MSN, *Professor Emerita of Nursing*
- Spalding, Robert Emmet, Jr., MS, *Extension Associate Emeritus*
- Sparks, LeGrand McIver, MS, *Professor Emeritus of Entomology*
- Spragins, John Diggs, PhD, *Professor Emeritus of Electrical and Computer Engineering*
- Stafford, Georgeanne Hatch, *County Extension Agent Emerita*
- Stanley, Edward Lemuel, MS, *Professor Emeritus of Mathematical Sciences*
- Stanton, Lynn Arthur, PhD, *Professor Emeritus of Agricultural and Applied Economics*
- Steadman, Mark Sidney, Jr., PhD, *Alumni Distinguished Professor Emeritus of English and Writer in Residence*
- Steiner, Pinckney Alston, PhD, *Professor Emeritus of Physics*
- Stephens, Robert Lorin, MS, *County Extension Agent Emeritus*
- Stevenson, John Lovett, PhD, *Assistant Dean Emeritus of Undergraduate Studies, Director Emeritus of Honors Program; Professor Emeritus of Parks, Recreation, and Tourism Management*
- Stewart, Harry Eugene, PhD, *Professor Emeritus of French*
- Stillwell, Ephraim Posey, Jr., PhD, *Professor Emeritus of Physics*
- Stockham, James Allen, MFA, *Professor Emeritus of Art*
- Strange, Sylvia Fortner, BS, *County Extension Agent Emerita*
- Strickland, Deborah Riley, *County Extension Agent Emerita*
- Sturgis, Eugenie Ventre, MS, *Professor Emerita of Mathematical Sciences*
- Sullivan, Sophia Elizabeth, MS, *Librarian Emerita of Cataloging*
- Sutherland, Milford Hunt, MS, *Professor Emeritus of Agricultural Economics and Rural Sociology*
- Swanson, David Mitchell, PhD, *Professor Emeritus of Management and Economics*
- Sweeney, James Napoleon, MA, *County Extension Director Emeritus*
- Swicegood, Myrle Lutterloh, PhD, *Assistant Director Emerita of Extension Home Economics; Professor Emerita of Home Economics*
- Syme, John Hutton, PhD, *Professor Emeritus of Forest Resources*
- Tainter, Franklin Hugh, PhD, *Professor Emeritus of Forest Resources*
- Tanner, Gloria Ann, EdD, *Professor Emerita of Nursing Science*
- Taras, Michael Andrew, PhD, *Head and Professor Emeritus of Forest Resources*
- Taylor, Charlotte Murrow, EdD, *Professor Emerita of Counseling and Educational Leadership*
- Taylor, Mary Lee, *Distinguished County Agent Emerita*
- Tesolowski, Dennis Gregory, EdD, *Professor Emeritus of Technology and Human Resource Development*
- Testin, Robert Francis, PhD, *Chair and Professor Emeritus of Packaging Science; Professor Emeritus of Biosystems Engineering*
- Thomas, Frances Petrie, BS, *County Extension Agent Emerita*
- Thompson, Regina, MA, *Professor Emerita of Nursing*
- Thomson, William Russell, MS, *Distinguished County Extension Agent Emeritus*
- Tillinghast, David Charles, PhD, *Professor Emeritus of English*
- Tinsley, William Allan, PhD, *Professor Emeritus of Agricultural and Applied Economics*
- Titus, Sylvia Smith, MA, *Professor Emerita of English*
- Titus, Terry Charles, PhD, *Professor Emeritus of Food Science*
- Todd, Boyd Joseph, PhD, *Head and Professor Emeritus of Industrial Management*
- Trent, Buford Earl, MED, *Professor Emeritus of Parks, Recreation, and Tourism Management*

Trevillian, Wallace Dabney, PhD, Dean Emeritus, College of Commerce and Industry; Professor Emeritus of Economics
 Turk, Donald Earle, PhD, Professor Emeritus of Food Science
 Turner, Albert Joseph, Jr., PhD, Professor Emeritus of Computer Science
 Turner, James Alexander, Jr., JD, Professor Emeritus of Accounting
 Turner, Raymond Clyde, PhD, Alumni Distinguished Professor Emeritus of Physics
 Tyler, Thomasina Cooper, Distinguished County Agent Emerita
 Ulbrich, Carlton Wilbur, PhD, Professor Emeritus of Physics
 Ulbrich, Helley Hewitt, PhD, Alumni Professor Emerita of Economics
 Underwood, Richard Allan, PhD, Professor Emeritus of English
 Usrey, Malcolm Orthell, PhD, Professor Emeritus of English
 Vissage, Wayne King, MS, County Extension Agent Emeritus
 Voelker, Evelyn Cecilia, PhD, Alumni Professor Emerita of Art and Architectural History
 Vogel, Henry Elliott, PhD, Dean Emeritus, College of Sciences; Professor Emeritus of Physics
 Von Rosenberg, Joseph Leslie, Jr., PhD, Professor Emeritus of Chemistry
 Von Tungeln, George Robert, PhD, Professor Emeritus of Agricultural Economics and Rural Sociology
 Waddle, Gerald Lee, PhD, Professor Emeritus of Marketing
 Wagner, Donald Finch, PhD, Professor Emeritus of Horticulture
 Walker, Gerald Lee, PhD, Professor Emeritus of Art and Architectural History
 Walker, John Henry, PhD, Professor Emeritus of Educational Foundations
 Walker, Walter Saxon, MEd, Professor Emeritus of Poultry Science
 Wallace, Myles Stuart, PhD, Professor Emeritus of Economics
 Wallenius, Kenneth Ted, PhD, Professor Emeritus of Mathematical Sciences
 Waller, Robert Alfred, PhD, Dean Emeritus, College of Liberal Arts; Professor Emeritus of History
 Wannamaker, Patricia Walker, PhD, Professor Emerita of German
 Ward, Carol Marie, PhD, Professor Emerita of English
 Ware, Robert Edward, BS, Professor Emeritus of Zoology
 Warner, John Robinson, DF, Professor Emeritus of Forestry
 Washington, Russell McCoy, County Extension Agent Emeritus
 Watkins, Betty Palmer, PhD, Professor Emerita of Vocational Education
 Watson, Katherine Ramsey, MMath, Professor Emerita of Mathematical Sciences
 Webb, Byron Kenneth, PhD, Dean and Director Emeritus of Cooperative Extension Service; Professor Emeritus of Agricultural and Biological Engineering
 Webb, Carol Johnson, Associate Dean of Extension Emerita
 Webb, Hugh Weyman, MS, Professor Emeritus of Building Science
 Webster, Henry Wise, PhD, Professor Emeritus of Animal, Dairy, and Veterinary Sciences
 Weir, Eldon Lee, EdD, Professor Emeritus of Graphic Communications
 Wells, Amos, Jr., BS, County Extension Agent Emeritus
 Wells, Mae Edwards, MEd, County Extension Agent Emerita

Welter, John Finlay, MS, Professor Emeritus of Poultry Science
 West, William Elmer, PhD, Chair and Professor Emeritus of Industrial Education and Graphic Communications
 Wheeler, Richard Ferman, PhD, Head and Professor Emeritus of Animal Science
 White, Donald, BS, County Extension Agent Emeritus
 White, Mervin Forrest, PhD, Professor Emeritus of Sociology
 White, Richard Kenneth, PhD, Neuman Professor Emeritus of Natural Resources Engineering in Agricultural and Biological Engineering and Environmental Engineering and Science
 Whitehurst, Clinton Howard, Jr., PhD, Professor Emeritus of Management and Economics
 Whitmire, Jerry Morris, MA, Professor Emeritus of Spanish
 Wiggins, Emily Sutherland, EdD, Professor Emerita of Home Economics
 Willey, Edward Parker, PhD, Professor Emeritus of English
 Williams, Gloristine Fowler, County Extension Agent Emerita
 Williams, John Boyce, BS, State 4-H and Youth Development Coordinator Emeritus; Professor Emeritus of Agricultural Education
 Williams, John Newton II, PhD, Professor Emeritus of Animal Science
 Williams, Patricia Miller, Interim County Extension Director Emerita
 Williams, Woodie Prentiss, Jr., PhD, Professor Emeritus of Food Science
 Williamson, Robert Elmore, PhD, Professor Emeritus of Agricultural and Biological Engineering
 Willis, Samuel Marsh, PhD, Professor Emeritus of Industrial Management
 Wilson, Martha Craft, County Extension Agent Emerita
 Wilson, Thomas Virgil, PhD, Alumni Professor Emeritus of Agricultural and Biological Engineering
 Wise, Milton Bee, PhD, Vice Provost of Agriculture and Natural Resources Emeritus; Professor Emeritus of Animal, Dairy, and Veterinary Sciences
 Witcher, Wesley, PhD, Professor Emeritus of Plant Pathology and Physiology
 Witherspoon, Gayland Brooks, MArch, Associate Dean Emeritus of the College of Architecture; Professor Emeritus of Architecture
 Withington, Marian Hull, MS, Librarian Emerita
 Wixson, Bobby Guinn, PhD, Dean Emeritus, College of Sciences; Professor Emeritus of Biological Sciences
 Wood, Julia Taylor, MS, Professor Emerita of Home Economics
 Wood, Wallace Blackwell, Jr., Distinguished County Agent Emeritus
 Woodruff, James Raymond, PhD, Professor Emeritus of Agronomy and Soils
 Woods, Sam Gray, BS, Professor Emeritus of Animal Science, Edisto Experiment Station
 Wright, Robert Eugene, DVM, Professor Emeritus of Animal Science
 Wynn, Eddie Dowell, MCRP, Professor Emeritus of Agricultural and Applied Economics
 Wynn, Mable Hill, MS, Professor Emerita of Parks, Recreation, and Tourism Management
 Yandle, Thomas Bruce, Jr., PhD, Alumni Distinguished Professor Emeritus of Economics
 Yang, Tah-Teh, PhD, Professor Emeritus of Mechanical Engineering
 Yardley, Darrell Gene, PhD, Professor Emeritus of Zoology
 Yates, William Pierce, MS, Extension Program Coordinator Emeritus

Young, Joseph Laurie, MArch, Professor Emeritus of Architecture
 Zahner, Robert, PhD, Professor Emeritus of Forestry
 Zehr, Eldon Irvin, PhD, Professor Emeritus of Plant Pathology and Physiology
 Zielinski, Paul Bernard, PhD, Director Emeritus, Water Resource Research Institute; Professor Emeritus of Civil Engineering
 Zimmerman, James Kenneth, PhD, Professor Emeritus of Biochemistry

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